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司中多卦看鄰術律

An Abso-Ming-Wen-lutely	Absey-Booke	(9-30-54)	A156451
Book of Radicals	(Shu Pu)	(10-7-54)	A156452
Rime Store	(Yon Fer)	(11-12-54)	A161354
Rough Cloth	(Zao Jing)	(11-24-54)	A162915
Silver Cradle	(Yut Wo)	(12-21-54)	A165835
Dragon Pearls	(Maw Ni)	(1-17-55)	A169682
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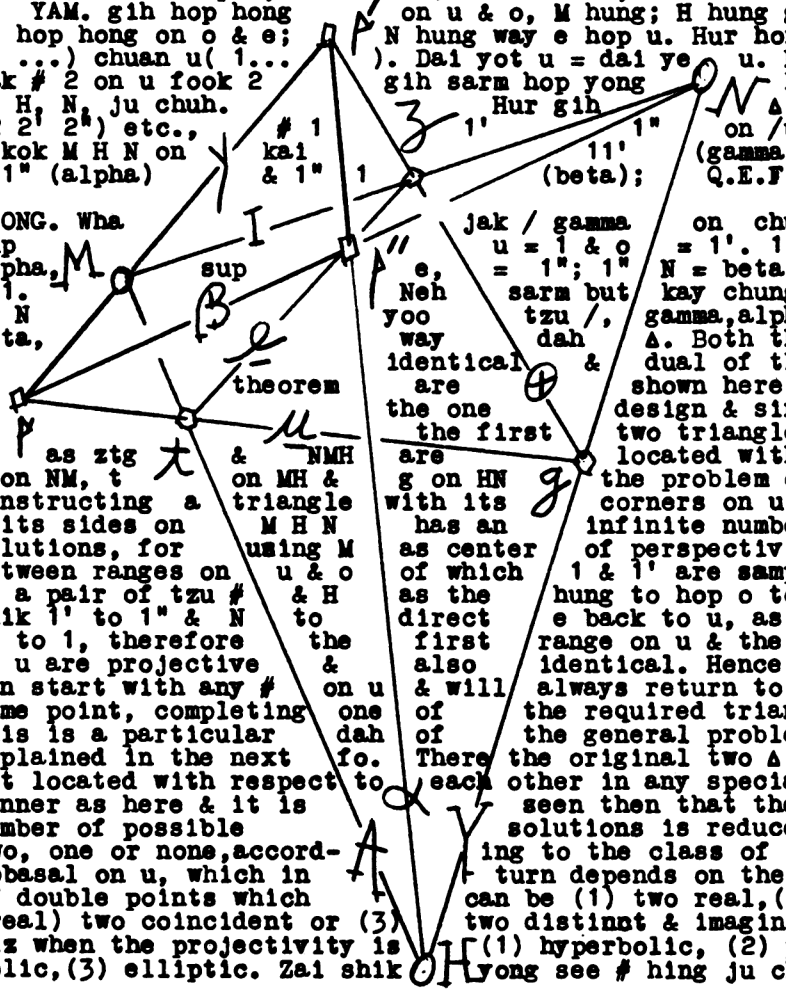
North Well	(Bo Dzing)	(1-3-56)	A216860
Millet Valley	(Sah Kuk)	(2- -56)	A

極軍已軍

(0) SEEN. Dai sup bart Siao Shu Jih mun SUK; fon cheek way jak Loo, SAH KUK; Chur SUNG DAH KOU YUK; Liung SOO CHUNG DO KWA KON TSOU YAN LUK. Kon wen tung peen (2).

(1) TEK SAM KIH & LIONG. Kon BO DZING (40). Dang joy KIH. Khaw Δ M H N, kay kai A (MH), Y (HN), I (NM) tung kok gih Δ t (eu), g (uo), z (oe). WAN: way Δ 1 1' 1" (kok) on u o e & kay kai gamma (11'), alpha (1'1"), beta (1"1) tung M, H, N. Dah shee woo ho. DAH. Jak # 1 on u. 1M = gamma,+ o = 1'; 1'H = alpha, + e = 1"; 1"N = beta, + u = 1.

YAM. gih hop hong on u & o, M hung; H hung gih ye hop hong on o & e; N hung way e hop u. Hur hong u (1 ...) chuan u(1...). Dai yot u = dai ye u. Neh jak # 2 on u fook 2 gih sarm hop yong hung M, H, N, ju chuh. Hur gih Δ 11'1" (2 2' 2") etc., # 1 1' 1" on /u o e & kok M H N on kai 11' (gamma), 1'1" (alpha) & 1" 1 (beta); Q.E.F.



LIONG. Wha jak / gamma on chung M sup u = 1 & o = 1'. 1'H = alpha, sup e, = 1"; 1" N = beta,+u, = 1. Neh sarm but kay chung M, H, N yoo tzu /, gamma,alpha & beta, way dah Δ. Both the identical & dual of this are theorem shown here on the one design & since the first two triangles, as ztg & NMH are located with # z on NM, t on MH & g on HN the problem of constructing a triangle with its corners on u o e & its sides on M H N has an infinite number of solutions, for using M as center of perspectivity between ranges on u & o of which 1 & 1' are samples of a pair of tzu # & H as the hung to hop o to e, shik 1' to 1" & N to direct e back to u, as e.g. 1" to 1, therefore the first range on u & the 2nd on u are projective & also identical. Hence we can start with any # on u & will always return to the same point, completing one of the required triangles. This is a particular dah of the general problem as explained in the next fo. There the original two Δ are not located with respect to each other in any special manner as here & it is seen then that the number of possible solutions is reduced to two, one or none, according to the class of chuan cobasal on u, which in turn depends on the sort of double points which can be (1) two real, (2) (real) two coincident or (3) two distinnt & imaginary, viz when the projectivity is (1) hyperbolic, (2) parabolic, (3) elliptic. Zai shik yong see # hing ju chuh.

(2) WAI & NAI DO HING. Dang (4) khaw ye fat sam neh kok

(2 Hao) Δ M H N (joy fat chan) & kai Δ /u kok 1 1' 1" on u o e ma) on M, 1'1" (al- on N. DAH. Yong M H N hung hop hong u to o,o to e & e to u.

shik H & N woo # mo o e. WAN way Δ kay & kay kai 11' (gam- pha) on H & 1"1(beta)

Hung =	M	H	N
Hong =	u	o	e	u
Hai #	U	O	E	U
	U'	O'	E'	U'
	1	1'	1"	2
	3	3'	3"	4
	5	5'	5"	6

Jak on u = 1', /u = 1', 5Mo = 5 3'He = 3"Nu = Way & hung tung 1MA = 1, neh d, neh MDu hai # gih

1 3 5 hur 1Mo 3Mo = 3', '. 1'He =1"; 3" & 5'He = ye hong chuan hai ## kay M on chee mo 2MA = 2,etc. sup A = D & = U & MD'u = U' u(1 3 5) & u(2 4 6).

5". K1, 1"Nu =2, 4 & 5"Nu = 6. Hur on neh 1 3 5 tzu 2 4 6. yong tsen yeet A hop u = A, kien, neh Way chuan cheh D', hop fook hur U & U'

K1, MUo = O, HOe = E, NEu = U & Δ UOE dah gih neh kok U on u, O on o kay kai UO H & EU on N;Q.E.F.

wan E on e & M, OE on

way lun keen sup ju sam poo, sam =UOE

Δ U'O'E' lun dah. A hur tung u, U & Shee d maw A hur (keen) Zai chuh

U' U= lun

Yong Shee shee U' & shik

lun hai d mo tsing & yot dah meh.

Fo fat soon neh see / u o # tzu / way can be ex- but in each

way yong see # M e k, yoo dah see hing ...yong jak ho jak ho kok (kai) hing; neh the theorem tended to polygons of any number of sides case the number of solutions is the same

H N K & jak ho

as above for the same reasons, for we merely increase the number of steps or perspectivities between the final two cobasal ranges which are projective on /u as fixed by the two sets of three points each, 1 3 5 & 2 4 6. Zai way do.

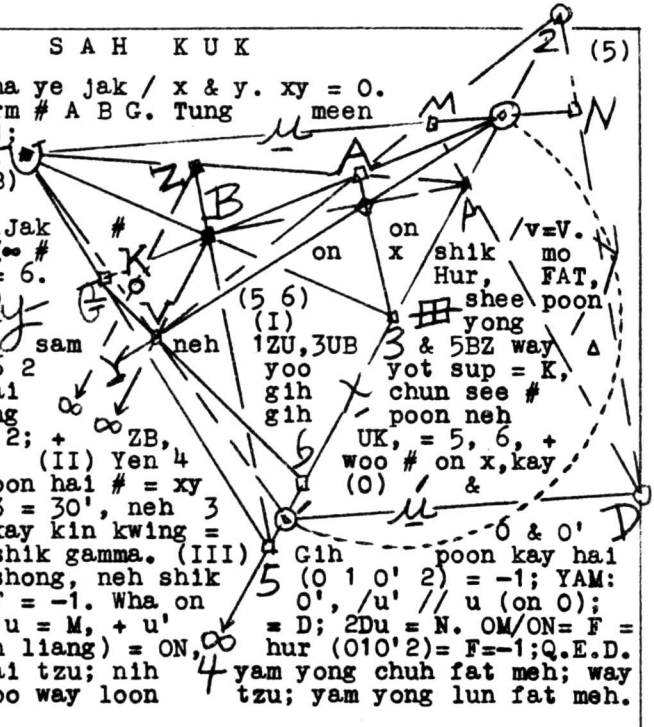
(3) SEE # & / VAI. Khaw see / a b g d. Way on ag, BG on ad, AD on hur /AB on # gd. YAM. kai abgd & say chee jeet & lyn on bg bd gd sup jak B on A/gd & lyn ag Yong naw mo kien meh;

tung meen

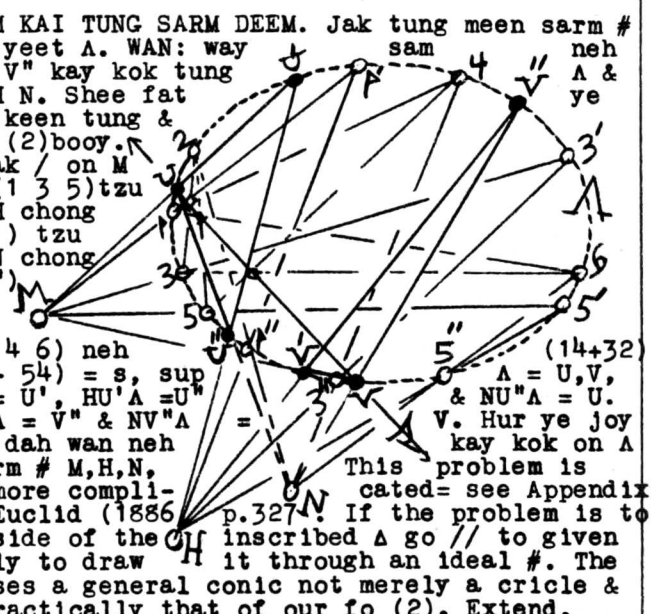
see # A B G D & /GD on # ab,BD bg, AG on bd, Way chun see GD on ab etc on yot # A & & ad, etc.

shee sung fo,shik tek!

(4) POON VAI. Wha ye jak / x & y. xy = O. On y jak sarm # A B G. Tung meen jak # U. UAx = 1; UBx = 3; UGx = 5. UO = u. (3A + 1B) lyn O = v & way (x v y u)O = −1. Jak VAx = 2; VBx = 4(∞ # fat chan); VGx = 6. shong (1 2)(3 4) on /x. YAM. on 1 3 5 way sam neh Z U B, kok / 4 6 2 hur x kot yee kai Z U B K way shong x + ZU, BK = 1, 2; + ZB, ZK, UB, = 4, 3. (II) Yen 4 shong 3 wung. Poon hai # = xy UVx (O'); hur O3 = 30', neh 3 chung gih yuan kay kin kwing = on x, neh yuan shik gamma. (III) # fun shun jak shong, neh shik yong nee lung, F = −1. Wha on jak / on 1, sup u = M, + u' = −1, yen MO (lwen liang) = ON, Gih poon shee hai tzu; nih liong, zai, & poo way loon


2
M
N
A
B
K
G
(5 6)
(I)
1ZU, 3UB
yoo
gih
gih
on x shik Hur, shee yong & 5BZ way yot sup = K, chun see # poon neh UK, = 5, 6, + woo # on x, kay (0) &
/v=V. FAT, poon
Δ
6 & 0'
D
5
4
Gih poon kay hai (0 1 0' 2) = −1; YAM: 0', /u' // u (on O); = D; 2Du = N. OM/ON= F = hur (010'2)= F=−1; Q.E.D. yam yong chuh fat meh; way tzu; yam yong lun fat meh.

(5) YEET NAI SAM KAI TUNG SARM DEEM. Jak tung meen sarm # M H N & jak yeet A. WAN: way U U' U" or V V' V" kay kok tung kay kai tung M H N. Shee fat dah, keen pien, keen tung & tsing pien. Kon (2)booy. WAY. Wha sarm jak / on M sup A way poon (1 3 5)tzu (1'3'5'). Yong H chong way poon (1'3'5') tzu (1"3"5"). Yong N chong way poon (1"3"5") tzu (2 4 6). Way cheh gih (1 3 5)chuan (2 4 6) neh /(16 + 52)/(36 + 54) = s, sup hai #. Hur MUA = U', HU'A =U" Ju MVA = V'; HV'A = V" & NV"A = Δ UU'U" & VV'V" dah wan neh & kay kai on sarm # M,H,N, sometimes made more compli- to Todhunter's Euclid (1886 /, that is simply to draw solution here uses a general conic not merely a cricle & the method is practically that of our fo (2). Extend.


sam
neh
A &
ye
(14+32)
A = U,V,
& NU"A = U.
V. Hur ye joy kay kok on A
This problem is cated= see Appendix
p.327 If the problem is to inscribed Δ go // to given it through an ideal #. The

(6) LO WAY PING KOK. On / x khaw see # A B G D. WAN lo whaw AB & GD way ping kok, neh kok BoA = kok DoG tung # o on lo u, yuan kay chung O & pan kin = OU = Ogu = Odu. DAH & WAY. Tsih khaw (A D) & (B G) ting poon on /x & way kay wung neh # shong ∞ (K). (I) Mo shik yong yuan tung kot AD & BG kay boon ⊕ chih sup /x ≡ wung O. (II) shik yong tsen see # neh yee kai gih see # Z Q R C sup /x way poon shong (A D) (B G) (O K) neh K = woo wung tan. & O ≡ Shik wha jak on A, ≡ A/ Z/ Q, sup woo/ i, ≡ on x B (BZR) #Q & jak sup i, ≡ ∞# R & sup (AZQ) ≡ yoo # Z; tsen Δ, 6=A D=2 shee yoo ye 4=B G=3 shong tan ∞=K O=0 lyn tsen Δ -------- shee DR + GQ ≡ dai see # C # ling on x (mo fat chan). simply shik of fat Δ, making a neat method whereby Δ AZB ju Δ GCD & by similar sam it can be yam that OA·OD = OB·OC = OU fong. Thus without considering poon vai instructions can be: wha AQ + BR = Z & GQ // AQ, + DR // BR, ≡ C & ki ZCx ≡ wung O, O being the # such that the product of its distances from A & D ≡ shing gih kay so OB X OG. Next find the # U on x such that OU fong ≡ OB·OG ≡ OA·OD. Thus OU ≡ radius of circle of inversion u with A kyn D & B kyn G, or the circle of antisimiltude gih ye yuan kay kwing A D & BG. WAY: wha yuan a kin kwing O A, sup d (ching x at D) & or yuan b kin kwing O B sup g (ching x at G), then Oda ≡ Ogb = OU (pan kin gih yuan u + x = U), U being one double # of poon (kon siang) & poo shee limit #circle gih coaxality (elliptic) of yuan kay kin kwing AD & BG. Lun kwing # yuan = V, lun sup gih ux (mo shik joy). Ki jak # tung u lyn AB & GD way ping kok tung jak #o on u (yot shik on dang joy), neh kok BoA ≡ kok DoG. Hur u shee dah lo gih wan; Q.E.F. & conversely any # which satisfies the condition of subtending equal angles with the two segment ends AB & GD does lie on the locus u which is a circle whose center is the wung & which cuts x at the double point of the involution determinedby pairs A D & B G. Wha yuan wooy Δ DoA & Δ GoB yoo tung maw neh Oo, hur kok OoD ≡ kok oBD = oAB by Euclid III, 32. OoG≡oBG. OoG = OoD+DoG & oBG=BoA+oAB. Hur OoD+DoG=BoA+oAB(oAD); hur DoG ≡ BoA; Q.E.D. Yam chang kien; way sih kien, meh.

x/Q	R	C
Z	A	B
O	Q	.
K	G	.
R	.	.
D		

Q	Z	A	·	D	C	R
R	Z	B	·	G	C	Q
R	Q	K	·	O	Z	C

hur way ZQR, woo # neh QR ≡ ∞/ i. Tzu gih poon # A, B, ≡ D, G, kok (mo tung tzu tan lyn) & hur ZCx ≡ wung O, neh joy Δ with ye woo # Q & R is

(7) WHA JU SAM NAI YUAN. Dang ℓ tung peen loon woo / & lwen yuan A. Wha kay kin y lwen ching ℓ = wung X, kyn gih A = chung L. On // ℓ, sup ℓ K. Kx'A sup D & D' shee TTP # & X & Y TTP #. Hur A gih fo wan. meen jak A; B G nai A, ag = ABG ju

DAH & WAY. A=1 on A, a'ℓ = aleph; Wha g // G'A'B' & bt = nai &

= U & aleph I & teth, lyn U lon & ju

ℓ, sup kay loon L wha x' lwen = Y. yA = 0 & ℓ = ± 45° shong = 0 & loon yuan Khaw sam A' WAN wha neh kok A'B'G' chuh & # A B

Wha t maw mwa jak # tℓ = teth. g'ℓ=gimel; b'ℓ = beth (mo fat g' & b // b' way a // a'. Nah way kok ag & tg = ba, hur kon Euclid IV,2 kok ABG yuan twan = kok kang kot maw t. Ju kok nai yuan twan kok kang maw t & kot AB. Poo yong yuan upsilon chung U. chung X & pan kin XD sup y pan kin gih upsilon = UX. gimel on ℓ, lyn U sup III. b & t + ℓ + upsilon = II & IX; arc I III = II IX, hur III U I = kok IX U II & bt yen way tg = ba; ju chuh.

joy (I) khaw jak

90° yong B' G' in ju sam A = a'g' = G on A.

chan). GAB = AG BGA = YAM Yuan xi

a'g' way upsilon = = beth & on upsi- kok = ag

(8) YOT PUN WAY CHUAN. Kon Tai shu & pee 23 with ISAAC NEWTON Book I Lemma XXII of PRINCIPIA (1686). Chung O & cheh o & yot shong tzu meen # shik W & ting "yot pun" neh "COLLINEATION" in which any # in plane corresponds to (itself or) some other plane # uniquely. In fat such tzu mun HOMOLOGY if center O & axis o be distinct (kon (9) or if chung tung cheh joy ELATION. Gih ELATION yot pun way kung chuan on jak / on O, yoo united hai #, joy O. Gih HOMOLOGY yot pun way gwo chuan on jak / on kon (9). FO O, neh x, yoo ye keen hai # O & U, yong tan tzu WAN way yot pun tzu chuan on x tung O shee (W=2 ka ho; joy (ELATION) chuan shong tzu r = +4). tzu b = 1) (L = −2 tzu f = ∞)(C=−4 (1 ∞ 4 x') Hur yong nee gai shik (2 −2 −4 x) = & x' = 2x/(x+2)yi ping & hai #= ± 0.

(8 Hao) Wha jak / on O (mo fat chan =) y & jak ye # on y neh D & D'. Yong shong, neh (CD + rD')/(LD + fD') lyn (WD + bD') = yot pun cheh o. Yen yot pun joy shee ELATION, hur /o tung chung O; Q.E.F & Q.E.D.

(9) FAT YOT PUN (GENERAL HOMOLOGY) WAY GWO CHUAN (HYPERBOLIC PROJECTIVITY) TUNG JAK CHIH on CHUNG O, NEH / x, YOO TOK (JOY LWEN).

2'=W b=3' -2'=L f=-1' 4'=C r=∞ 1'=U U=1' O =O O= O

Yong yi ping = $3x/(4-x) = x'$ hur hai # ping = $x^2 - x = 0$ & (1 ± 1)/2 neh U= 1'& /x. WAY. Khaw jak / = y (OK) & jak ye /y. Hur (WD + cheh = /o. Nim / ox = U & yot pun hai # on x. hur x chuan shee keen hai / # pien neh shing / gih ye hop hung hop o bD'o; LDo = & UDo = UD'o;ODo = gai yuan A,yong K O1= s, / cheh gih tzu

ye hai # = V=0 on on chung O D & D'on bD') lyn (CD + rD')/(LD + fD') = cheh yot pun hai # on x. Joy o mo on O, hur x chuan shee gwo neh yoo ye keen hai # pien neh U & O. Nim chuan = shing gih ye hop neh D & D' shee ye hung hop o to x neh WDo = bD'o; LDo = fD'o; CDo = rD'o & UDo = UD'o;ODo = OD'o; etc. Wha gai yuan A,yong K hop x =A & way O1= s, / cheh gih tzu A chuan.

(10) TANG CHUAN /SHIK. Dang (II) khaw chuan ---------- joy kon /chirk-5=W b=3/2 on x tang chung wha -3 L f 2 Hur on O ye #D & D'. ∞ C r -1 jak /y & jak lyn (LD/+ fD') 2 5 (WD + bD') shee mo chih, 4 9 (CD + rD') shee mo sup x. 7 ∞ Kay hai #tsing. Thus by 3+2√-3 U the formula when projectivi-3-2√-3 V ty on /x is ---------- elliptic join of the x'=(x+23)/(7-x) points formed by the ---------- conjugation do not constitute one straight line as in the other two cases.Further in- vestigation will determine what sort of locus is made by these points. Nih dah wan meh.

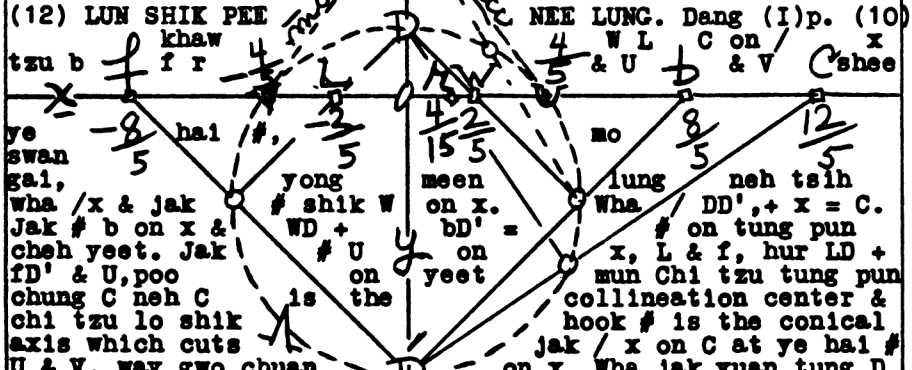
(11) TUNG PUN TZU GWO CHUAN & YEET. Dang (9) siang wha lwen tok on /x & khaw yi ping = $x' = 16/25x$, neh $xx' = 16/25$ & chuan shee shing poon, yoo hai tzu. Hai ## = ± 4/5 (U,V). Wha y ching /x tung #O. Khaw D & D' on y tzu D ken y = +2/5 & D' ken y = -8/5, liang chu O ken chu on x. Khaw O chung gih tung pun (collineation) hur kay cheh = yeet A, shee yuan joy, (mo chih) & Ax = U = 4/5 & V = -4/5, shee ye keen pien hai deem gih gwo chuan on x kay shong,yong yi ping,kon chirk.

(11 Hao) (DW + D'b)/(DL + D'f)/DC + D'r)/(DU + D'U)/(DV + D'V)/(DO + D'∞)/(D∞ + D'O), ju chuh way lo gih yuan A, neh ye chuan but kay chung D & D' tzu / sup = yeet A. D & D' ye hung hop x to A & DWA = D'bA; DLA = D'fA; DUA = D'UA, etc. Ye A hong way poon yoo chong Phi on y neh tzu # shik D'bA tzu D'WA, D'CA tzu D'rA, kay lyn + = Phi & tzu poon cheh = x, neh Phi U shee maw mwa A at x poon hai # shik alpha, on Phi, sup A = A DxA = D'x'A & fon yee D'xA

2/5 = W b = 8/5
−2/5 = L f = −8/5
12/5 = C r = 4/15
4/5 = U U = 4/5
−4/5 = V V = −4/5
x = O ∞ = x'
x' = ∞ O = x
x = b W = x'
Fat chih

& a; Dax = x, DAx = x';

(12) LUN SHIK PEE khaw tzu b f r ye −8/5 hai #, −2/5 swan gai, wha /x & jak Jak # b on x & cheh yeet. Jak fD' & U, poo chung C neh C chi tzu lo shik axis which cuts U & V, way gwo chuan D' & L yong tsen yeet A to A & way A chuan kay cheh = s (U/V/Q), Q = W'f' + b'L.



yong # shik W WD + # U is the

4/15 2/5 mo 8/5 12/5 meen on x. bD' = on yeet

W L & U C on / & V x shee lung Wha / DD', + x = C. # on tung pun x, L & f, hur LD + mun Chi tzu tung pun collineation center & hook # is the conical jak / x on C at ye hai # on x. Wha jak yuan tung D with D as hung to hop from x

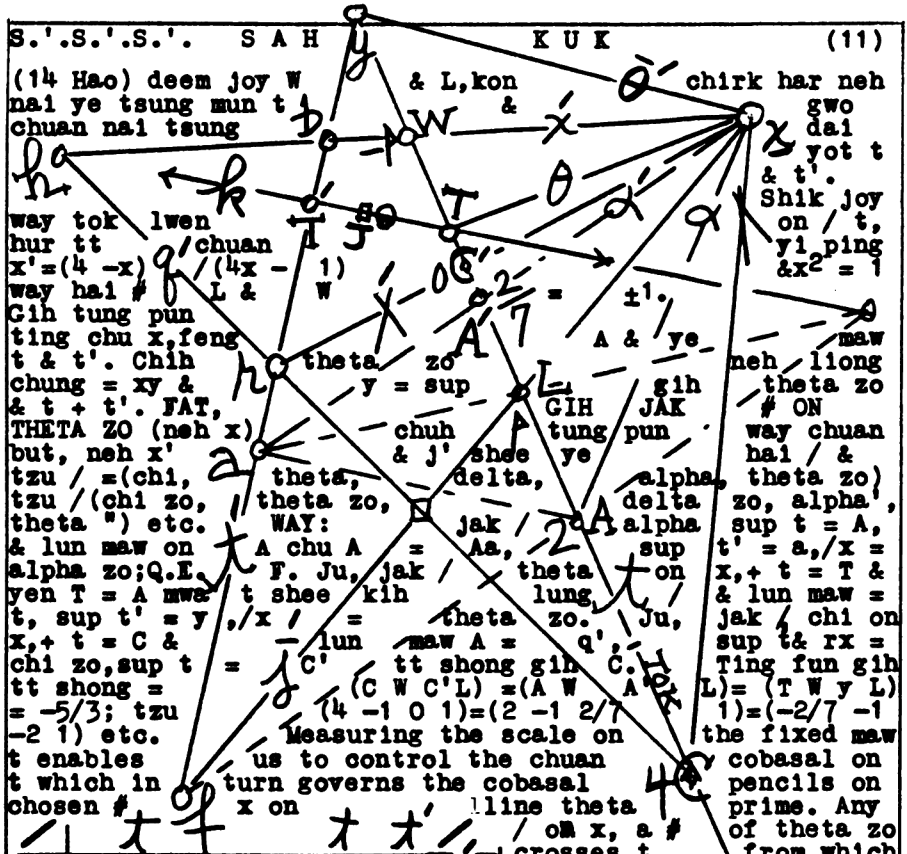
Wha ye // neh u//v on U & V yong tung nee lung neh jak / on W sup u,v = M,F & shong b,/F,+ u = N, hur chuan ting fun (characteristic ratio) = UM/UN. Poo, LMv = F' & fF'u = N; CMv = D'(joy) & rD'u = N; ju chuh. Thus we can always get the mates by using the anharmonic rational fat & the same using the auxiliary conic A & also by the collineation method with D & D', all three illustrated here. D & D' are the canters of two projective pencils whose corresponding rays meet to make the locus of chi which cuts x at double points U & V, real & distinct because chuan gwo.

(13) LOON POON SHIK GIH GWO. Dang har (II) (10) khaw gwo chuan on x = woo / ℓ, sup loon gwo A, = U & V kay hai # gih poon shong (W b) (L∞ f) (C r).

Tsih wha lwen yuan A sup ℓ way A = loon gwo. Maw u' & v' mwa U & V, sup = X, gwo chung & XU (u'), XV (v') = mik. Yong X hung & chong way A poon (U U) (V V) (D D'). Jak / on D neh DWW' sup x = W, sup A = W'. D'W'x = b, way W & b shong. Ju jak / DCC' sup x = ℓ at C & A at C' & D'C'x = r, way C r shong. Ju khaw lwen woo # on ℓ = L, hur DLA = D & D'Dℓ = f, way L f shong & f = wung tzu L woo # on /x. On hai # V shik wha jak / v & lwen liang VM = − VN. Wha

(13 Hao) WM + bN = F; CM + rN = F" & LM + fN = F', hur F/F
/F" = u,// v & tung U, neh u = U, lun hai # gih x poon.
Nim ting fun = VM/VN = −1 gih poon. Nim poo (XDfD')=
−1 & D'W'D, DC'D', LDD' chun ching kok (lwen),
ju chuh gih way tzu poon tan. Here the com- plement-
ary line corresponding to the collineation chung
= f, is the hyperbola(loon) A which acts as a
curved axis to cut jak /x at the two self-
corresponding # U & V. Use D & D' on A
to get any new pair of tzu ##; thus
choose C on x as tan then DCA =C'&
D'C'x = r, to make C & r mates x, in the
projectivity cobasal on tion which
since it is an involu- has the
double correspondence (hai tzu)
which means that the mate of
any # is fixed. Thus if we call
the caps W L C range alpha
& their mates
b f r range
beta, then any # of
alpha hong if
put in beta keeps the
same mate. then put W in beta,
Note that D & D' E.g., D,+ x = b,etc.
project- ive, pen- cils WD'A/ are the centers of two
rays meet on the whose corresponding
# of which is a locus of conic A each
of a hyperbolic gih self-conjugate #
Siao Shu for do fo lin- polarity; kon Tai &
new exercise set up a col- eation where D & D' such concepts. As a
generate a parabola, in both lwen & loon
Nim kung shee yoo yot cheem mwa
maw woo chih meh.

(14) TUNG PUN LIONG. Kon Tai Shu TUI IU (966)
Dang chien (11) shik liong
gih booy fo neh khaw x = # & pui =
feng A mwa maw Wb (x'), Lf (j')
Cr(q') Ty (t), yT'(t'), teth/d(d'),
Aa (a'), ju chuh, neh shong gih
chuan on chan gwo tt' kay chung =y,
t hong (W L C T teth= A y) tzu
t' hong (b L r y d a T') kay
cheh = (Wf + bL = Q)/(Wr + Cb=J)
/(Lr + Cf = X)/(Teth a + Ad)/
(AT'+ya) ju chuh, = Pappus
/k, shee su tt' = T T'& T shee
A mwa gih tzu maw t; T' shee
A mwa gih maw t'. Yong cheh k way
sin shong # on gwo tt' neh shik A & a: fat;
Afk/L,+ t' = a & gih but kay chung = x, /xA (alpha) tzu /
xaA' = alpha zo. A & A' shee shong gih chuan on t kay hai



x'	xW	-P	-P	xW	b	x
f	L	+P	P	L	f	j'
C	4	0	C'	h	X'	
θ	T	-2/7	-2	y	y	θ'
δ	D	∞	-1/4	D	d	δ'
α	A	2	2/7	A	a	α'
θ'	y	-2	2/3	y'	f	θ''

(15) KEN TUNG PUN LIONG. Joy khaw /x & y maw feng chan kai gwo A kay mwa ye # O = xy & O' = woo # sup gih Wb,Lf, Cr, neh on x,W = +1,L=-1, C = +2 & on y, b = +2,f= -2, r = +4. Ye chuan hong on x & y, neh (W L C)tzu (b f r) kay lyn Wb Lf Cr shee maw gih feng A. Tan ting tung pun neh feng A & chih tung O (xy) neh / OP. Some of the lines, e.g. OP are not drawn, for clarity, but can be supplied from pairs of determining points Hur, FAT, tung pun way ye chuan but on jak #, as P,on /OP. Yot but shee PW,PL,PC, tzu Pb,Pf,Pr & lun tzu /way yong fat shik: jak / PC sup x = C (2) & lun maw be- sides CO, gih A = Cr,sup r (4),/P = Br, tzu PC,Q.E.F. Way maw gih A yong cheh neh Pappus / k = (Wf+ bL = Q∞) /(fC + Lr = X"joy)/(Cb + rW= J); hur way r, shik Cbk = J, /W, y = r; ju chuh. Poo yong swan gai / neh: way chuan yi ping . (W L C x) = (b f r y) hur (1 -1 2 x)=(2 -2 4 y) or y = 2x & tzu hai # = O & ∞ neh yen ye chuan / pien tzu # on x & y = O O, & ∞ ∞ neh O shee united # & x∞=Y, y ∞# = X, hur jak / on O shee maw gih A & poo woo /t lun maw, neh on sup gih Wb Lf & Cr meh. Yi ping y = 2x way lun tzu # on x & y,shik -2 on x tzu -4 on y &-2/ -4,// Wb etc. Hur P lyn -2'x) tzu P/-4(y) gih cobasal but on P way by Tung Pun. chuan

P(bfr) C + x = W'L'(∞=Y) & C'way chuan gih y(b f r)neh khaw (W'L'C')=x' & y(bfr) tzu x', hur (2 y)=(-1 ∞ -4/3x' & yi ping ≡ y = (x' + 2) & hai #= dah boon gih ping y^2+ neh O & -4,hur O united # & -4 on y tzu -4 on /x for x', hur maw gih yx'feng shee bW',fL', rC', -4(y)/-4(x & kay yot sup = P & lun mwa gih chuh feng=O # Poo yoo chuan x tzu x' neh (W L C) tzu (W'L'C') or (1 -1 2 x)=(-1 ∞ -4/3 x') or X' = -2x/(x + 1) xy hai ## = O & -3 on /x=x'. Hur PO & P/ -3(x) shee hai chih gih chuan but on P neh P(WLC) tzu P(W'L'C'). Nim chuan yoo mo hai tzu hur nim cho,neh gih P(W'L'C')tzu P(W L C)yi ping ≡ x = -x'/(x + 2), mo yong joy. Ken gih #P joy ≡ x= -2,y = -2 & the usual formula produces all val ping & incidences needed. E.g., C' = -4/3 on /x as sup of Pr with x. By the two point fat, Pr ≡ 3x - y + 4 = O, dah tung with y= O (equation of /x) gives x= -4/3; Q.E.D. Ju chuh yur. Obviously too if the relat- ion between x & y hong is given by y = 2x & kang y &x' by x' = -2y x & x' by x'=-2x/(x +1), /(y + 2) & kang these all tie togeth- consequentially,shik put y = 2x in x'= -2y/(y+2) & have x' = -2x/(x + 1). Thus by using ordinary rectangular Cartesian co- ordinates we control & har- monise tung pun & chuan.

(16) KEN TUNG PUN LIONG TSIH WOT YEET. Yong ching ken chih neh x (heng) & y (tsung) & tsih wha shik yeet = yuan A' kay ping ≡ $x^2 + y^2 - 2x + 2y + 1 = 0$, kay chung ken ≡ x = 1, y = −1 & kay pan kin = 1, hur kay ping: $(x-1)^2 + (y+1)^2 = 1$, or kon siang. Way lwen tok on x & y chu x+y = 0 & chee x(W C L)= 2 3 4 & y(bfr) = ∞ −3 −4; hur sarm A' maw = Wb, Lf, Cr & lun ye maw A'= x, mwa 1 on x & y, mwa −1 on y, neh Pappus / or cross-axis (sup cheh) gih chuan (WCL) tzu (bfr)= Π kay ping ≡ x − y = 1 neh (Wf + bL) / (fC + Lr) (Cb + rW) = Q/ X/ J = Π, + x & y = x & y mwa gih feng A' ting by maw Wb,Lf, Cr, OX, OY,neh x',j',q',x,y, whaw X = W' joy = 1 on x & Y = −1 on y. Nee gai way xy yi ping: (WLCx) =(bfry) or (243x)= (∞ −3 −4 y) hur y = (2 − 2x)/ (x −2) & hai # # ping ≡ x^2= 2 & hai # U,V on /x ≡ U =+√2 V=−√2. Feng A' gih xy

chuan Gih

chun K' rC'

kay joy neh = K'

shee yx' feng chan neh maw mwa ye # O & bW' + fL' + 00 jak /on Yi ping gih x' = y/(y +2) & cheh Π'≡ y = 2x. hur shik −1 on y / tung K' meh.

O. chuan kay Hai # = −1 on x'

yx' ≡

sup 0 & −1 (= x/)

Gih ki chuan neh xx' yi ping ≡ x'=x−1

tzu (W L C) & (W'L'C'), & hai #=united #, ∞onx.

Shik: gih xy u & uC'Π'/f,+ y = (2−2x)/(x− u = √2 (on y). (y+2)(in yx' Gih xx'yi x' = U' = √2 or √2 = 2 − √2) V= −√2) tzu W'=1 L'=3 C'=2 V') = K'(b f r

chuan x'=

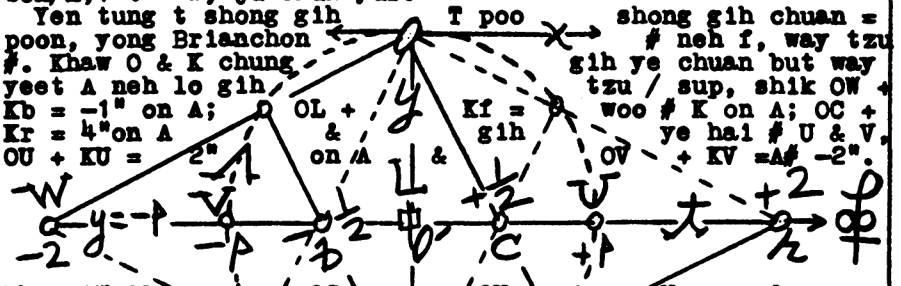
fat) & −1; hur vai √2/(√2+2) must = √2 −1, + 2√2 = 2 & Q.E.D. X(W=2 L=4 C=3 U= y(b=∞ f=−3 r=−4 u=√2 v=−√2) tzu x'(U'=(√2−1) V'=(−√2−1), or x'(W'L'C'U' u v) sup /x(=/x').

way # tzu x(U); Ubπ/W,+y= U'.Yam: ∞ put U = +√2 in fat & yoo y = (2 −2√2)/(√2−2) = Put y(u) = √2 in fat x'=y/ yoo x'(U') = √2 /(√2 + 2). ping x' = x−1,use x = √2(U) & yoo

(17) SHUN tsih (chung) shee gih T = 0 & on L, neh ≡ (−2 0' 1/2 1 −1) tzu (−1/2 ∞ 2 1 −1), hur nee gai way

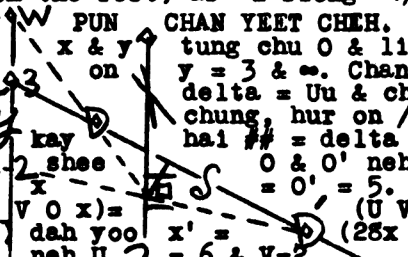
TUNG PUN KIH YONG WOT YEET. Dang (14) wha gai yuan A shee cheh yeet & kay # L poo chung gih tung pun mun T; ye ting # K on /y on L. FAT: T way chuan on jak /t theta(W L C U V) tzu theta zo (b f r U V)

(17 Hao) (W U C x)=(b U r x') or (-2 1 1/2 x)=(-1/2 1 2 x' & hur x' = 1/x & # gih theta siong gih theta zo # & fon yee, hur chuan shee poon. Kay hai # ping = x = ± 1, neh U = +1 on t & V = -1 on t, yong L = 0, chu,gih ching ken liang on t. Meen ching ken chu = 0 = xy joy. Way shong gih tung pun, yong ye ting # O & K; jak # on t,shik W; FAT: WOA / K, + t = b; LOA = K,/K,= k,+ t = ∞#f on t; COA/K,+ t = r; UOA/K,+ t = U; ju VOA/K, + t = V. Poo yen hai tzu, bOA/K,+ t = W, ju chuh yur.


Yen tung t shong gih poon, yong Brianchon #. Khaw O & K chung yeet A neh lo gih
T poo
shong gih chuan = # neh f, way tzu gih ye chuan but way tzu / sup, shik OW + woo # K on A; OC + ye hai # U & V,
Kb = -1" on A; Kr = 4"on A OU + KU = 2"
OL + & on A
Kf = gih &
OV + KV =A# -2".
Khaw OW,OL, & Kb, Kf, Kr,
OC, KU,
OU KV,
OV = w, ℓ, c, u, = B,F,R,u',v' meh.
Chuh / shee tzu but kay chung O & K. wot lo shee yuan A.
rays gih ye chuan Tzu / sup way A joy Sup tan (cross elements) sup & lyn shee maw gih feng,

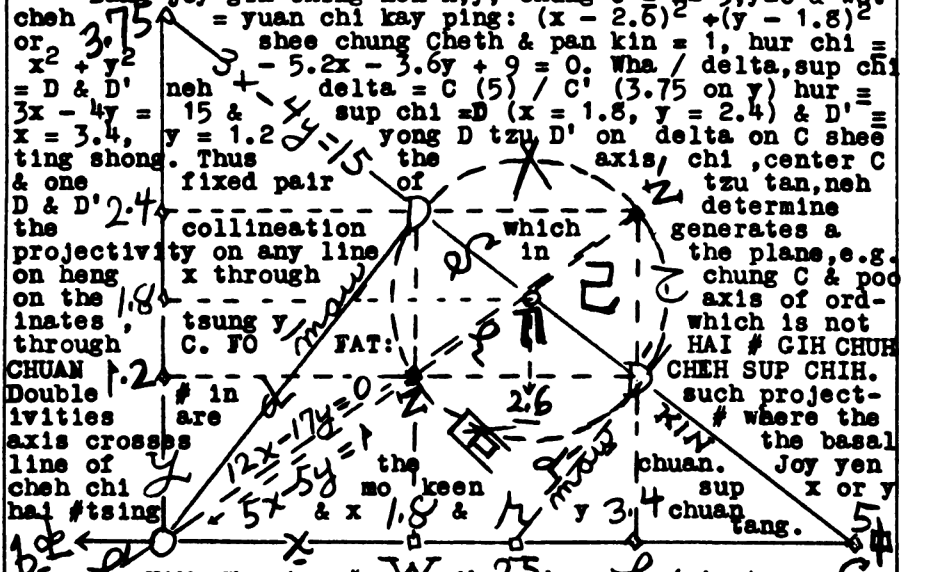
joy feng chan = Brianchon # (∞ on t) f, neh (wR / cB) + (wk / yB) + (ck / yR) = sup chung (cross center) f; hur way shong yong fat shik: wR / f, + c,/K, + t = b;or yRf=k, + c,/K = k, + t = f; cBf= woo /,+ R,/K = R, + t = r; etc. This is an example of a harmonic homology, for the center L & axis A, divide harmonically any pair of corresponding # in the collineation T, but as here the axis is wot yuan A,it means that any pair of tzu #, as W & b on t are shun shong gih V & U or fon yee; poo shik L & f are inverse re. yuan kyn A & ju C kyn r; # on A are self-conjugate,hence U & V are double #; lun shik O (L) & ∞ (f) are reciprocal, & similarly with the rest; as -2 siong -1/2,1/2 siong 2.

(18) KIH TUNG ching ken 6 & 2 & u & v chan gwo neh tung pun (T) T way chuan = V;lun tzu # chi,lyn D',+ tzu sup fun (U 0 x) =(6 2 5 x' hai # = 4 ± 2, = u=3 &v=∞ W=4 & b = 2,neh hur yi ping = & y' = 6 -y & kay hai # = 3 & ∞ yen shee kar poon meh.



CHAN YEET CHEH. Dang har joy way tung chu O & liang U & V on x = y = 3 & ∞. Chan yeet cheh shee delta = Uu & chi = Vv. Khaw U = chung, hur on /x on chung U, hai ## = delta + x= U & chi + x O & O' neh O & 5, yen OD + = O' = 5. Hur Nee gai gih (U V O' x') or (6 2 (28x -60)/(5x -12) & Gih /y,hai # & lun shong = sup y = b = 2; (3∞4y)=(3∞2y')

(19) KIH KEN TUNG PUN WAY TANG CHUAN YONG WOT YEET CHEH. Dang joy gih ching ken x,y, chung C ≡ x= 5,y=0 & wgt cheh or $x^2 + y^2$ = yuan chi kay ping: $(x - 2.6)^2 + (y - 1.8)^2$ = D & D' neh shee chung cheth & pan kin ≡ 1, hur chi ≡ $x^2 - 5.2x - 3.6y + 9 = 0$. Wha / delta,sup chi 3x − 4y = 15 & delta = C (5) / C' (3.75 on y) hur ≡ x = 3.4, y = 1.2 sup chi ≡D (x = 1.8, y = 2.4) & D' ≡ yong D tzu D' on delta on C shee ting shong. Thus the axis, chi ,center C & one fixed pair of tzu tan,neh D & D' determine the collineation which generates a projectivity on any line in the plane,e.g. on heng x through chung C & poo on the tsung y axis of ordinates, through C. FO FAT: which is not CHUAN # in HAI # GIH CHUH Double ivities are CHEH SUP CHIH. such project- # where the axis crosses the basal line of the chuan. Joy yen cheh chi mo keen sup x or y hai #tsing & x & y chuan tang.



YAM. Way tzu # gih shong (nim tzu mo hai tzu neh correspondence is not commutative except with an involution, hur if b be mate of W, W is not necessarily mate of b, kon booy chieh nai do fo) shik fat: WD + chi ≡ Z, lyn D',sup x ≡ b,joy ≡ ∞ # on x, hur W shong b. Khaw b ≡ L ≡ ∞ (on x/) & LD + chi ≡ Z'./D',+ x ≡ f ≡ 3.4, hur b=L tzu f=3.4. Ju, OD joy ≡ maw d,+ chi ≡ D,/D'=delta,+ x ---/x shong----- ≡ C ≡ 5. CD ≡ delta,+ chi ≡ D',/D' ≡ maw d',+ x ≡ r ≡ 2.5; hur yi ping chu nee

W	=	1.8
L	=	∞
O	=	0
C	=	5
		1
		-1
		3.6

b=L	=	3.4 ≡ f
5.	≡	C
2.5	≡	r
7		
31/7		
1.8		

gai neh: (O C W x) ≡ (C r b x') or (O 5 1.8 x) ≡ (5 2.5 ∞ x') & dah yoo x' ≡ (17x − 45)/(5x −9) & gih x=x' way hai # U,V ≡ (13 ± √−56)/5; Q.E.D. Now to find where chi sup x, put y=0 in chi ping & yoo: $x^2 - 5.2x - 3.6y + 9 = 0$, & kay dah way x (U,V) =(13 ± √−56)/5. Gih /y chuan ≡ (O=O W'=∞ L'=2.4 C' = 3.75) tzu (C'= 3.75,b'=1.2,f'=∞, r' = −10/3) & hur y' ≡ (12y −9)/(y − 2.4) & hai # (u,v) = 1.8 ± 2.4√−1. YAM: chi sup /y chu dah tung gih chi & y ping, neh put x= 0 in chi ping gives $y^2 - 3.6y + 9 = 0$ & kay ye dah boon ≡ 1.8 ± 2.4 √−1; Q.E.D.

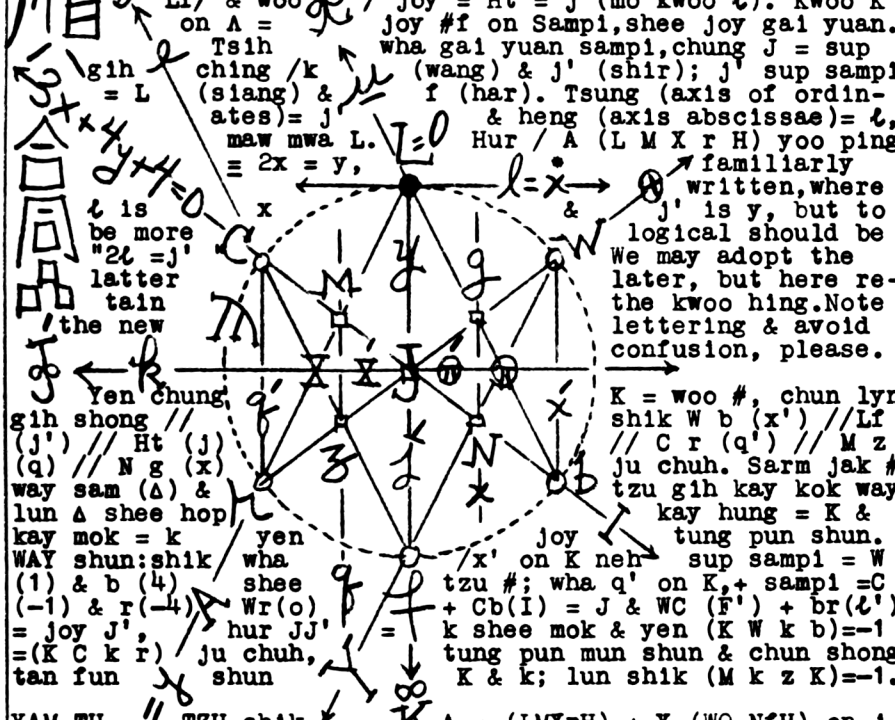
U =(13 + √−56)/5
V =(13 − √−56)/5

Nim shik /ZZ' sup x ≠ 0; yam ZZ' ≡ zeta ≡ 5x −5y =1, & OZ' ≡ zeta zo ≡ 12x − 17y = 0.

In (18) example the axial conic was the degenerate hyperbola consisting of the two / chi & delta, which cut /x & y at their respective kih tzu ##;here (19) the proper conic chi crosses /x & y shik at conjugate imaginary # #.

(20) HOP TUNG PUN TU TZU. (PERSPECTIVE COLLINEATION FUNCTIONAL CORRESPONDENCE) Khaw tung pun chung S = yℓ, woo # on ching ken tsung y & cheh shee /s, hop chih gih ye hop sam MHN & ztg kay tzu kok lyn on S neh Mz = q, sup Ht = j, + Ng = xi, = S. Hur by Desargues' fat, kay tzu kai sup lyn = s, neh (MH = A + zt=e) = X; (HN = Y + tg = u) = Q; (NM= I + gz = o) = J(∞ # yen I // o) & X Q / J = s. Tsih jak gih shong M & z. Way tzu tan sin shong, shik L & L': (jak # L) tan LMs/z,+ SL, = L'. Lun shik; gih HMs = X,/z,+ SH,=t H t) (N g) neh: lyn z,+ SN = g. & ju, NMs = J, tung pun, neh Gih hop yong yot chih, as s, shee one line of fixed # as the axis & sup of fixed as S for the chung; nim on cheh x ting poo ; on / on S, # mo ting,shik H shong on /j; on /s, X shong X, & t poo kih tzu & J ju chuh. Q Hur jak shong khaw yong way lun jak ; shik yong H t way neh: MHs = X & M z poo, LHs/t,+y=L' Xtq = z; hop tung pun shee Lun fat gih TU TZU (functional correspon- dence); shik yen/ML hur /zL' & / HN (Y) tzu /tg (u), # tzu MLY = P, tzu # zL'u = P'; yam, PMs/ z,+ SP = P' ;nim poo lyn # tzu lyn #, sup / tzu sup /; neh col- linear # are transformed into a set of lyn # & intersecting / become lines which are cross at a # tzu sup of the first two /; conics changed to conics & so on, thus gai yuan A will be- come lun yeet, not necessarily a circle. Zai yi A & kwan yam chuh tsai fat! Joy shik yong ching ken kay chu = 0 & ken gih jak # shee: M =(1 1) H = (-2 -1); N = (2 -3); z = (1 0); t =(-2 2) g =(2 -4); Q = (1 -5/2); X = (1/4, 1/2); J =(sℓ= Iℓ= ol); hur zt = e = 2x + 3y= 2; HN = Y = x + 2y =-4; gz=o = 4x + y = 4; QJX = s = 5x + 2y = 3; chung gih gai yuan A = L = (0, -1) & pan kin = 1, hur A = $x^2 + y^2$ + 2y = 0 Kao sir way ping gih tzu A' meh · kon tai & siao shu for fat gih way ping of yeet tung ung # & yong ung # tzu O, K, 2, -2, & 1, or lun jak ung shik. Kon YIEH MEE (14) ssq & Tai Shu KIN ZANG (XXIV, twan 6) Way tzu liong gih chuh fo & poo mo kien way loon tzu meh. Chuh peen ki '56-1-1-1-13-40: kao shih chun chu shao tong!

(21) SHUN HOP TUNG PUN. Joy yong chee king gih hop, neh L shee yeet # & ℓ tzu maw; K shee hop chung (hung) & k hop chih neh mok & x = Ng, y = nh, hur nim gih joy ching ken kay chu kwoo O = sin # L & heng kwoo x = sin joy ℓ (mo woo chih; tsung = j' tzu kwoo y & geek gih keek J'= joy ((Nz (f')+ (Mg (L')); K joy = j'j,neh woo # on Lf/ & woo joy = Ht = j (mo kwoo ℓ). Kwoo K on A = joy #f on Sampi,shee joy gai yuan. Tsih wha gai yuan sampi,chung J = sup gih ching /k (wang) & j' (shir); j' sup sampi = L (siang) & f (har). Tsung (axis of ordinates)= j & heng (axis abscissae)= ℓ, maw mwa L. Hur / A (L M X r H) yoo ping ≡ 2x = y,



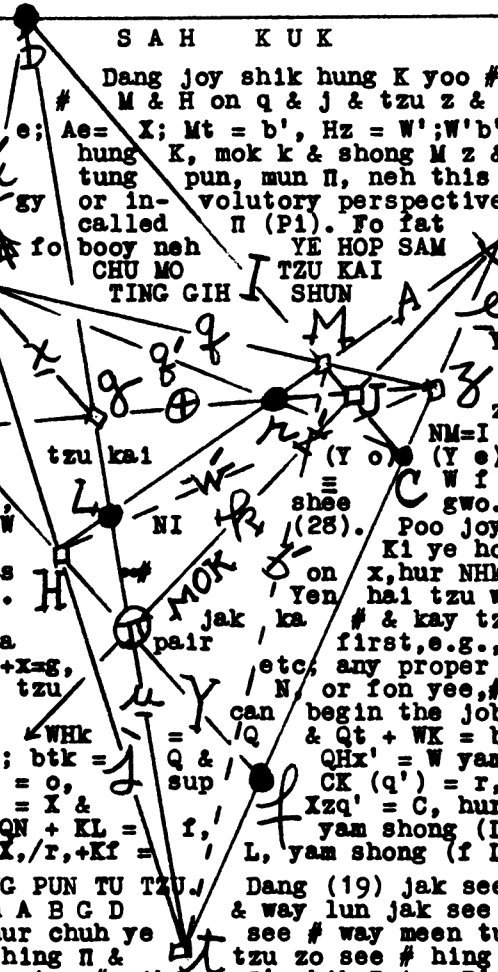
familiarly written,where ℓ is x & j' is y, but to be more logical should be "2ℓ =j' We may adopt the latter, but here retain the kwoo hing.Note the new lettering & avoid confusion, please.

Yen chung gih shong // (j') // Ht (j) (q) // N g (x) way sam (Δ) & lun Δ shee hop kay mok = k WAY shun:shik (1) & b (4) (−1) & r(−4) = joy J', =(K C k r) tan fun

yen wha shee Wr(o) hur JJ' ju chuh, shun

K = woo #, chun lyn shik W b (x') //Lf // C r (q') // M z ju chuh. Sarm jak # tzu gih kay kok way kay hung = K & joy tung pun shun. /x' on K neh sup sampi = W tzu #; wha q' on K,+ sampi =C + Cb(I) = J & WC (F') + br(ℓ') k shee mok & yen (K W k b)=−1 tung pun mun shun & chun shong K & k; lun shik (M k z K)=−1.

YAM TU TZU shik A = (LMXrH) + Y (WQ NfH) on j at H. Way tzu # &, neh (f zXCt) = e, + u(bQgLt) at t on j; neh # on cheh mok k shee kih tzu & / on K (hung) / kih tzu, (nim # on / on K mo kih tzu, it is the / as a whole which is self-corresponding in the tung pun Yen tung pun shun shee hai tzu neh double or reciprocal, mutual,thus it is a two-way street, if b tzu W then W tzu b, etc, whereas nai booy fo tzu mo hai neh fat chuan & mo poon ju joy.Yam shik;booy,kon dang (16) W = Y (NH) + o (zg) kay ken x = 12/7,y = −20/7; b = I(MN)+u(tg kay ken ≡ 12/5 & −23/5. b' tzu b ≡ bHs/t,+ Sb, neh mo W. Tung yee suh, joy, W = 1 (# on sampi) & tzu tan = b (4). Way # tzu b:(joy)shik, bCk = J, Jrx' = W, or bLk = Q & Qf + x' = W, or bHk/t,+ x' = W; etc. Gih fo booy tzu yeet lo, W f C b L r,= E,shee E',neh b f" r b" f r"; joy tzu WfCbL r = sampi, shee b L r W f C, poo sampi, hence the conic fixed by ye hop sam mo tzu lyn sup is invariant but not it.



(22) LUN SHUN. Dang joy shik hung K yoo # on jak / q j & x.Jak # M & H on q & j & tzu z & t on q & j.

MH = A, zt = e; Ae= X; Mt = b', Hz = W';W'b' = X'; XX'= mok k;hur hung K, mok k & shong M z & H t ting chuh shun tung pun, mun Π, neh this harmonic homo- lo- gy or in- volutory perspective collinea- tion, fat seen fo called Π (Pi). Fo fat shee yam LO TING booy neh YE HOP SAM WAY YEET YEET CHU MO TZU KAI SUP & CHUH KAY CHUNG TING GIH SHUN TUNG PUN & CHEH MOK. SHEE HUNG kok Yam: joy sam # ztg MHN tzu Δ MH=A tzu & tzu kai: tzu tg=u; zt = e;HN=Y hur mo tzu kai (Y o) NM=I tzu gz=o, (u A)(A o) (Y e) (e I) (I u mun yeet E joy, ≡ W f C b L r lo soo fat,kon MAW shee gwo.(Yam yong NI (28). hing gwo tih. Poo joy yeet #hook Ki ye hop sam chu siang, jak N as on x,hur NHk = Q,/t,=u & ux = g,tzu N. Yen hai tzu way lun tan gih shong yong jak ka # & kay tzu;i.e. use either one of a pair first,e.g., Ntk/H,+ x = g, or NLk/f,+x=g, etc; any proper pair will do,yielding #g tzu N, or fon yee,#N tzu g & either element can begin the job!

Now yen WHk = Q & Qt + WK = b, (W b)shee shong. Fon yee; btk = sup QHx' = W yam hai tzu. Ju, Cbk = J;JW = o, CK (q') = r, way shong (C r);poo, rMk = X & Xzq' = C, hur shong(r C) Poo, Lgk = Q; QN + KL = f, yam shong (L f) & fon yee,jak fCk = X,/r,+Kf = L, yam shong (f L),& Q.E.D.

(23) CHUAN TUNG PUN TU TZU. Dang (19) jak see # tung meen, neh A B G D & way lun jak see # tzu neh A' B' G' D', hur chuh ye see # way meen tung pun. Mun dai yot see # hing Π & tzu zo see # hing Π',hur sin jak # gih Π yoo tzu # gih Π',shik P tzu P'. WAY & YAM.

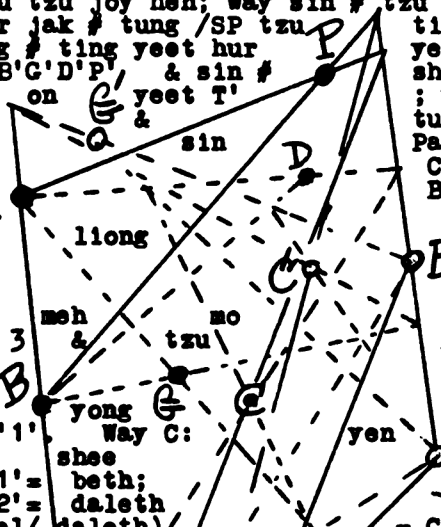
(I) Way C tzu C': Yen A B G D tzu A'B'G'D' hur ye but neh A(B G D) tzu A'(B'G'D') & kay sup chung (cross center) C = (AB + A'D')/(AD + A'B') sup (AG + A'D')/(AD + A'G'). Ju, sup chung C' gih B(A G D) tzu B'(A'G'D') = (BA + B'G')/(BG + B'A') sup (BG + B'D')/(BD + B'G').
Hur khaw wha sin / gih ye but neh AP tzu A'P'. WAY.

(II) Jak # P tung meen & AP + A'B',/C',+ AB,/A' = A'P'.
Poo, BP + B'A',/C',+ BA, /B', = B'P'.

(III) Hur, A'P' sup B'P' = P'; Q.E.L. & Q.E.D.

Fon yee; (A'P' + AB)/C',+ A'B',/A = AP & (B'P' + BA)/C',

(23 Hao) + B'A',/B = BP & AP + BP = P. However backward working of the rule does not means that the collineation is involutory which would be the case only if the formulae of (II) & (III) would change P' into P, which is not so. Thus the projectivity between the two forms T & T' is fat me poon. Nim tu tzu joy neh; way sin # tzu S & S' & wha SP tzu S'P',hur jak # tung /SP tzu ting # on / S'P'. Poo yen jak ung # ting yeet hur yeet lo A B C D P tzu yeet lo A'B'C'D'P', & sin # shik H on yeet T tzu # H' shee on yeet T' ; yam yong Pascal ia way #H on T & tung pun fat way H' on T' & hur sin Pascalia (tzu)yam T' shee yeet. Chun tu deem tzu shik (AG + BD) = V; way V', shee (A'C' + B' D') meh. Kao sir way liong gih fo fat.



(24) TUNG PUN joy, nih meh mo SHIK. Mo dang
in meen, 1 2 3 & tzu kien. Jak sarm
Wha jak / on gih T = 1'2'3'.
/ on 1' mun ,1,mun 11 & jak
tung pun ting yong Way C: yen 11', hur meen
T' = 1'2'3' &1'1' T = 1 2 3 11 &
1'(1'2'3') hur shee 1(123) tzu
aleph; 12 + 1'1'= beth; (11 + 1'2')=
gimel; 13 + 1'2'= daleth 12 + 1'3' =
beth) sup (gimel/ daleth) &(aleph /
= C,shee sup chung.

Jak #4 on / 23 & way 1'4' tzu 14, neh:

14 + 1'1' = heh, / C, sup 11,/1' = 1'4',sup
2'3' = 4'. YAM: (12 + 1'4')/(14 + 1'2')
sup (13 + 1'4') / (14 + 1'3') = C. Zai
way liong & shik yong 1 & 1' shee woo # #.

(25) TUNG PUN TING YEET. Dang (20) mo fat chan
khaw gai yuan A shee ting yeet gih tung pun
kay tzu ting tan neh (W f r) & (W' f' r') on A &
(y),keek gih Wf & (y') keek gih W'f'. Joy shik W = 1,
f = -4, r = 0; W'=4 f' = ∞, r' = -1; y = Wf & y' = w'+
f'. Gih chuh tung pun A ting, neh jak # on A tzu lun
(or kih) # on A,shik yen yi ping ≡ (1 -4 0 x)=(4 ∞ -1 x')
or x' = (24x -4) / (x + 4),hur shee #b = -2, b'=-26.

Hai # U, V = 10 ± 4√6 (len .2 & 19.8).

WAY & YAM TUNG PUN. Chuan but (f r y)W tzu (f'r'y')W',
hur kay sup chung T = (Wf + W'r')/(Wr + W'f') sup (Wf + W'y')/(Wy + W'f') sup (Wr + W'y')/(Wy + W'r').

Ju chuan but (W r y)f tzu (W' r' y')f' yoo sup chung T' = (fW + f'r')/(fr + f'W') sup (fW + f'y')/(fy + f'W') sup

(25 Hao) (fr + f'y')/(fy + f'r'). Sin meen # shong way: khaw P jak meen #; WP + W'r'/T,+ Wr,/W' = W'P' & fP + f'r'/ T',+ fr,/f'= f'P', hur f'P' sup W'P' = P'. Ju gih jak # on A/. Yen U & V shee hai #, WU tzu W'U, fU tzu f'U, WV & W'V shong ju chuh. Shik; WV + W'f',/T, + Wf,/W',sup A = V; or fU + f'W',/T',+ fW /f',= f'U',+ A = U; Q.E.D. Thus if we make a projectivity on a conic, three chosen # tzu sam lun jak # on A, let the pole of the chord which joins any two correspond to the pole of the tzu kot, thus fixing ye see # or quadrangles in the plane to determine the collineation. Then as explained booy get the cross centers T & T' & by the formulae each # of the plane has a unique # to tzu & points on the conic A correspond to other(or kih # on the same yeet proving that the conic is invariant gih chuh tung pun. Same method applied to two yeet projects # from one to the other when the two quadrangles are such as to determine the two yeet respectively. Compare all this with the more gener al way which holds between any two planes pien or tung kon MAW NI (15) & do lun fo. Zai way pee tung yot dang meh.

(26) CHANG LWAN VAI YEET. Dang ye pun lwan dang shik way & tang,yong Kon Tai Shu wot; joy tsih chih neh (56) & yeet 0

PUN WAY (21) 0; siang hook tung TUI IU see pun

khaw & har yeet gwo chirk. fat, kon (968) yong tan chang lwan Q = see m (12), n (34) s= p = (78), sup tung tzu ho.

Hur way nai 12 (m) 23 67 (ℓ) (b) 78 (p) (81 = side)sup ye mo len yin adjacent even sides) & way ho neh (m b n delta s ℓ p a) yoo cho yowooy m + delta, cho jaw ju chuh yur. FAT: shee kai hing nai yeet, hur k(k - 2) # sup gih len yin kai tung lo (k - 2) pun; bart kai hing (2 X 4 = 8), k = 4 k(k-2) = 8 # & (k - 2)° = ye pun shee yeet o. Nim gih look kai hing hur k(k-2) = 3(3-2) = 3 # tung lwan = yot pun lwan neh shee chih (/) & shik Fat GERGONNE: Shee ye k pun lwan sup (j sih k) j·k # on lwan pun j, yur k(k - j) # on lwan pun (k - j). (Kon MAW NI (11) & lun fo.) Joy shee Q & Q'ye see pun lwan kay sup (m n s p) + (a b delta ℓ)= 4X4 = 16#.

O bart kai hing neh 34 (n) 45 (delta) 56 (s) a) & yang kai (each odd kai (intersects its two non shee yeet o(A B G D H V Z C) m n s p yang hur ···delta wooy m + ℓ,(Z = ℓ + m,+/=V (2k kai) (A = a + n,+ℓ=C yang& mo(G = b + s,+a=B joy yoo (H = + p,+b=D & (delta/ lwan,---------- nai yeet, k = 3 & (k-2)pun = (3-2)= PASCALIA meh. way k fong # &

(26 Hao) (kon chirk har) & gih chuh sup look #,(j = 2,k=4) j·k = 8 tung j pun lwan O (dai ye pun lwan = yeet O), hur by fat Gergonne, k(k-j) = 4(4-2) = 8 # on lwan pun (k-j)= (4-2)= 2° neh yeet o(ABGDHVZC). Poo: khaw 4° lwan Q (= jeet gih ye 2° lwan neh alpha (m — & n) & beta (s & p) sup 3 pun lwan L (jeet gih ye pun lwan gamma ,= a & b, & delta (/), hur Q + L at 4 X 3 = 12 #.

Shee gih chuh 12, 6 on yeet , hur lun look on lun lun ye pun lwan & see # shee lun sup gih Q & ye yeet O & o, way lyn neh ℓ.

WAY: jak bart yeet O,hur 78 shee m n 18 = a & 23 an = A, as delta,sup delta = 2 3 4 5 8 neh A B lwan neh O + Q ye gih = Z & C, Way Z & ℓn = C, yeet o sing kay a + DH = 3 & 2. & CA(n) DH (p) & Hur chu O way O,siong bart deem yoo perms,chuh vai yong yi # 21544, TROPERMIC XXVII,ssq. yi shee 63-71 & a' delta' a'n'

neh 1 2 3 4 5 6 7 8 on wha see / 12 34 = 4° (chan) lwan & (ab) = chan gwo bs = G & bp = D. p = V & H. Khaw pun lwan L,+ Q way yeet O,hur on Hur o + 6 & 7 & lyn 7 / wha

8 on 56 Wha gamma. Wha 45 = gamma & # yoo 1 lun look ye pun yen 2X4=8, 8 # & yur gih o + Q = ℓ;Q.E.D. & ℓm = Z & yee way;gih wha bart kok + VZ (m)=1,& CA(n) & VZ(m) sup BG (s) 4. K1 ZC (ℓ)+ BG (s) = 7 & 6. & fon yee chu o fat sung meh. Yen 8! yi , neh 40320 pao do yeet, shik yze

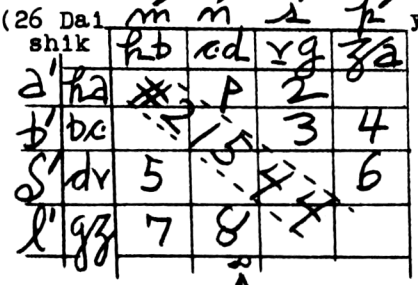
lun ki , Q way yur 12 Z / C 67 = ℓ Nim:fon bart # AB (a) GD (b) + HV (delta) sup

CALCULUS (1944) Hur, 52-84- = m' = 51, = 46 =A' b's' =G', ℓ'+m' =C' & = A' o' Zai way do yam fo fat & meh

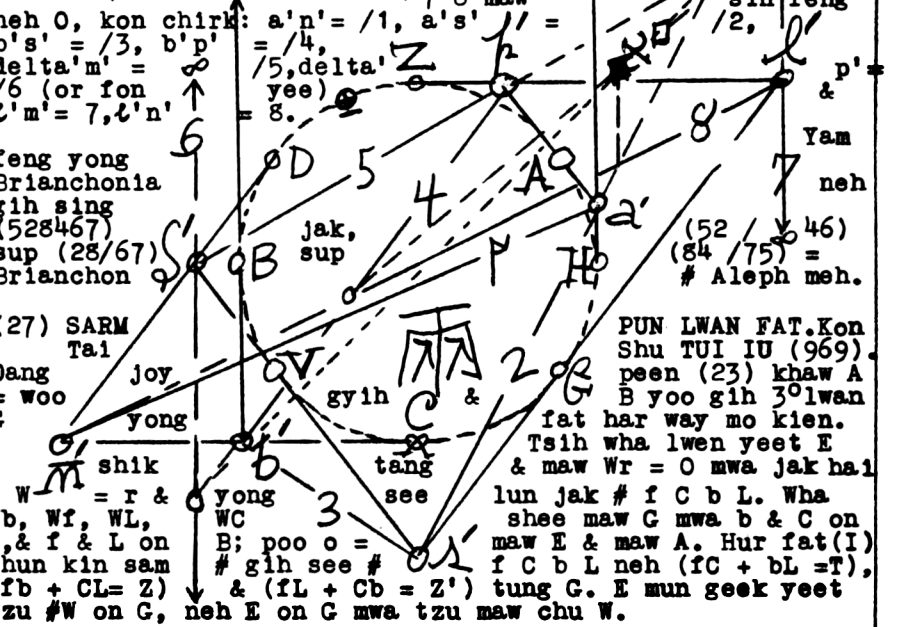
n' s' p' b'= 28, ℓ'= 37 & a'+ s' = B', b'p'=D', delta zo = V',H' & + m' p' = Z' & ℓ' n' sin 2° lo B' G'D'H' V' Z' C'= & ju chuh. shik yi way liong!

	12	34	56	78
	m	m	2	2
a	P	A	B	8
b	2	3	G	D
	V	4	5	H
	Z	C	6	7

(26 Dai shik ye hao) Dang joy lwen khaw gih liong neh yi # 21544 yong yeet o ≡ gai yuan, A=1, B = -2, G = 4, D = -1, H = 2, V = -4, C = ∞ (K). Yong maw mwa chuh # tzu siao chee & kay sup: hb=m', cd = n', vg = s', za = p'; ha = a', bc = b', dv= delta zo & gz = ι' Hur, mun / 1 2 3 4 5 6 7 8 maw sin feng /2,



neh O, kon chirk: a'n'= /1, a's' = b's' = /3, b'p' = /4, delta'm' = ∞ /5,delta' /6 (or fon yee) ι'm'= 7,ι'n' = 8.



feng yong Brianchonia gih sing (528467) sup (28/67) Brianchon jak, sup (52 / 46) (84 /75) = # Aleph meh. Yam neh

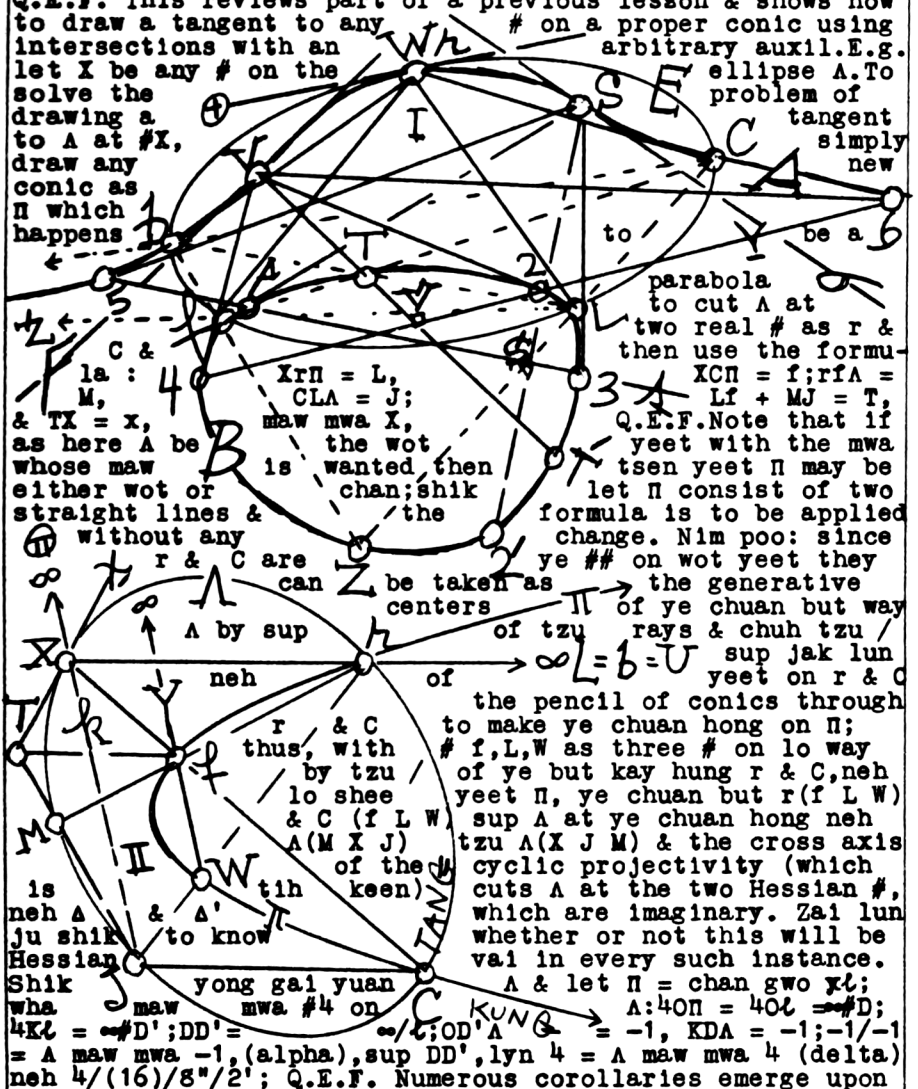
(27) SARM Tai Dang joy = woo G yong shik tang see yong WC B; poo o = # gih see # & (fL + Cb = Z') tung G. E mun geek yeet tzu #W on G, neh E on G mwa tzu maw chu W.

PUN LWAN FAT.Kon Shu TUI IU (969). peen (23) khaw A B yoo gih 3°lwan fat har way mo kien. Tsih wha lwen yeet E & maw Wr = O mwa jak hai lun jak # f C b L. Wha shee maw G mwa b & C on maw E & maw A. Hur fat(I) f C b L neh (fC + bL =T), # W = r & Wb, Wf, WL, A,& f & L on chun kin sam (fb + CL= Z)

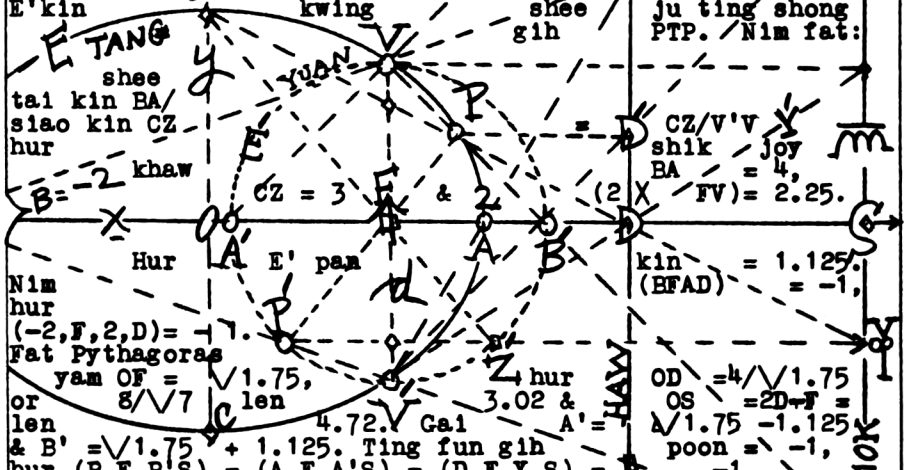
(II) W fat # on G. Special, "singular",or"mo fat" # shik V & S joy, mun FLEX,neh maw sup lwan tung mwa hur, maw mwa V mo sup G on lun # & mun triple tangent; ju on # S maw sigma = sarm maw. Hur geek yeet tzu flex chan,shik chu # S way sarm maw = sigma & lun G maw mwa 1 & 3 gih B & 5 on A & 1/3/5 = chih s & geek yeet tzu S = chan gwo / S & / sigma; ju gih # V geek yeet = chan gwo jeet ye / 246=v & sarm maw on flex V, = digamma.

(III) Gih flex S, s mun "shun geek", harmonic polar /,tzu S yen jak / on S,shik (S 2 S' 2')= -1, neh, sup G = ye lun # (2 & 2') fun shun S & s. Ju shik, gih flex V & shun geek v, fun shun T & T', neh (V T V' T') = -1. Yam yong jak shun lung, or nee lung (ting fun = -1), mo kien meh. Kon MACLAURIN,De.Lin.Geom.Prop.Gen.Sec.III.Prop.IX. ju chuh.

(28) YONG YEET SUP WAY MAW FAT. Kon JUN KOONG (1 & 2). Joy dang (II) har WAN wha maw mwa #L on yeet (kung) Π. DAH. Wha lun yeet (wot or chan) joy wot neh (tang) Λ, sup Π = C & r as jak ye # gih kay see sup. Hur, LrΛ = X, LCΛ = J; CXΠ = f, rJΠ = W. XJ = k, Wf = Y, Yk = Q (∞) & QL = u = ℓ, shee dah maw Lb on Π # L = b = U, shik woo mo fat chan, Q.E.F. This reviews part of a previous lesson & shows how to draw a tangent to any # on a proper conic using intersections with an arbitrary auxil.E.g. let X be any # on the ellipse Λ.To solve the problem of drawing a tangent to Λ at #X, simply draw any new conic as Π which happens to be a parabola to cut Λ at two real # as r & C & then use the formula : XrΠ = L, XCΠ = f;rfΛ = CLΛ = J; Lf + MJ = T, M, maw mwa X, & TX = x, Q.E.F.Note that if as here Λ be the wot yeet with the mwa whose maw is wanted, then tsen yeet Π may be either wot or chan;shik let Π consist of two straight lines & the formula is to be applied without any change. Nim poo: since r & C are ye ## on wot yeet they can be taken as the generative centers of ye chuan but way Λ by sup of tzu rays & chuh tzu / neh sup jak lun of yeet on r & C the pencil of conics through r & C to make ye chuan hong on Π; thus, with # f,L,W as three # on lo way by tzu / of ye but kay hung r & C,neh lo shee yeet Π, ye chuan but r(f L W) & C (f L W) sup Λ at ye chuan hong neh Λ(M X J) tzu Λ(X J M) & the cross axis of the cyclic projectivity (which tih keen) cuts Λ at the two Hessian #, is which are imaginary. Zai lun neh Δ & Δ' whether or not this will be ju shik to know vai in every such instance. Hessian Λ & let Π = chan gwo ℓ; Shik yong gai yuan A:4OΠ = 4Oℓ =#D; wha maw mwa #4 on 4Kℓ = ∞#D';DD'= ∞/ℓ;OD'A = -1, KDA = -1;-1/-1 = A maw mwa -1,(alpha),sup DD',lyn 4 = A maw mwa 4 (delta) neh 4/(16)/8"/2'; Q.E.F. Numerous corollaries emerge upon close study of this remarkable theorem, leen, pee & tsien!



(29) PAR TUNG PUN. Sin wen PAR = latus rectum, neh hai cheem tsung gih yeet. Par tung pun shee special collineation with hung F (focus)which changes a conic (mo yuan) into yuan chung F & pan kin = FV = pan par. The axis (mok)is /m ching x such that mx (S)/is on tai kin (major axis) & Ff =fS; f = haw,+ x = D & FD = DS. Hur woo # on x = Y / tzu D in par tung pun. F & S hai # in tzu chuan way on x by PTP,shee poon, tsu PTP = harmonic homology, yi tang E to yuan E'.Shik : jak # P on E,/V,+ m,/V', & sup E',=P' ; F/P +(VPm /V') = P'. Ju, way Z tzu Z', fat; ZPm/P',+ FZ = Z',on E'. Or A (yow tai kin kwing)/V',+ m,/V,+ x,=A', Ju,B (jaw tai kin kwing)/V,+ m,/V',+ E'= B'; or VPm / P', + FV (d),=V'. Yen PTP shun khaw yong jak E'kin kwing shee gih ju ting shong PTP. Nim fat:



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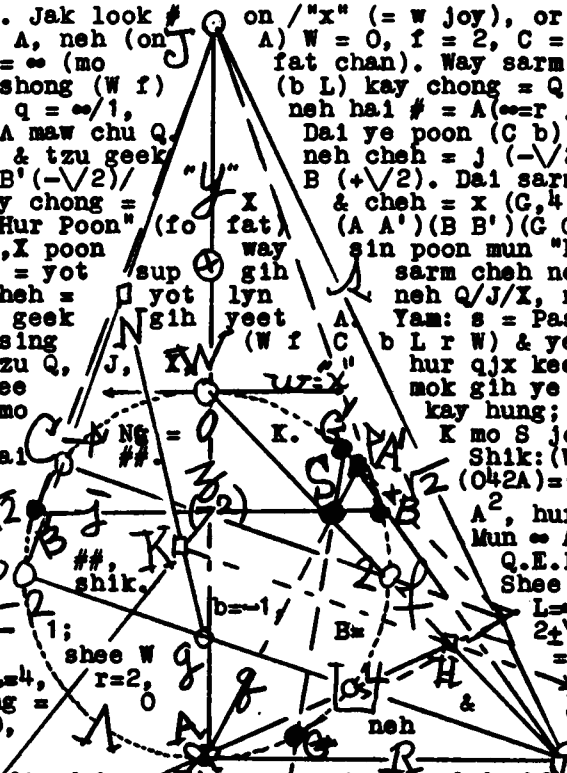
shee tai kin BA/ siao kin CZ hur B= -2 khaw CZ = 3 & (2 X FV)= 2.25. CZ/V'V shik joy BA = 4, kin = 1.125. (EFAD) = -1, Hur E' pan Nim hur (-2,F,2,D)= -1. Fat Pythagoras yam OF = 8/√7 or len √1.75, len 4.72. Gai hur 3.02 & A'= OD =4/√1.75 OS =2D+F = √1.75 -1.125 poon = -1, -1. -2√1.75 x & B' =√1.75 + 1.125. Ting fun gih hur (B F B'S) = (A F A'S) = (D F Y S) = E ping = $(x^2 / 4) + (y^2 / 2.25) = 1$, or $2.25x^2 + 4y^2 - .484375x^2 = 0$. E' ping = $x^2 + y^2$ gih kay chung F & pan kin =1.125. Chuan = poon on x yi ping is just a matter of routine; the geometrical way tzu # sih kien meh. Shik yong nee lung Wha d & m ching x on hai # F & S; shik B'Vm/V,+ x = B,neh ting fun = FV/FV' = -1; or AV'm/V,+ x = A'; ju chuh. Here the collineation with hung F & mok m can use V & V' as ye ting tan & poo, poon with hai # F & S,can use V & V'on d & # on m, to get same result. Foo = FP/PD' = P'F/FD. Yen P'F (E' pan kin) & FD (so kang F & f) ting, hur foo neh conic eccentricity is constant, approximately 0.661 meh. Zai kao way tzu loon mo kien meh,shee tih tsen ming pak!

Absey Yao:(Double ordinate to the major axis through focus PAR IS PARAMETER, HANDLE, HAI CHEEM TSUNG.

(30) HU TUNG PUN. Wha yeet E, shik tang, & maw o, mwa jak #O, sup tai kin x, = P'. Wha OD (mu), + x = P, way kok xo = kok mu x, hur O & D shee only ye # tung yeet E & hu yuan eta gih E # O. Wha / on pan dot H' gih OD, ching mu, sup o' (yung gih E # O), = eta chung H. Wha hu yuan eta maw O & on D. Fo fat: O shee hung & mu mok gih Elation yi E to Eta & H to t on o; neh t shee chong gih E poon kay tzu # on E way ching kok at O, shik MOM' = ching kok, A'OO ju & chun / on t way ye # on E to sub tend right angle at O; thus t is the center of this involution of # on E & the elation with hung O & axis OD (mu) transforms H, the center of the circle of curvature (eta) tzu # O on E, into # t. Tsih yong t tzu E hing & H tzu ---- eta hing in the Neh elation, mun t H HTP joy. jak E # M, M z lyn t, sup mok mu, = N g H',/H, + OM, = z on eta. Afterward X' X yong jak shong M' shik M & z, N & g, ju A' A chuh, shik: way sin D D shong N & g, neh; O O NM + mu = J, z, + ON, = ---- g on eta; or A' M + mu, /z, + OA', = A on eta. Nim shee jak sarm / on O way ye hop Δ, neh \ Δ tMN tzu Δ' Hzg, hur kay \ tzu kai sup way lyn neh k \ = JQX, neh joy (MH + \ zt = X) (HN+tg=Q) /(NM+ \ gz=J)=k. Way lun zai yong hu yuan gih gwo or kung & way tzu loon.

(31) CHEEM & HAW TUNG PUN. Dang har loon khaw E HU YUAN cheem = F & tai kin loon tang yot tai kok tzu haw = f; loon woo / = i & F, geek f = x; hur shee xE = A, A', tzu mok gih maw sup = aleph on i & tzu yi E to = aleph/D (xf), shee on F = tzu Harmonic Homology, hung F, maw sup E' = E. Chun cheem kot maw = D, # on E & kay B + B' on f, shik V + V' maw = beth; A + A' maw = aleph. Way tzu tan gih CHTP, shik: yong tzu ting # V, V' & BVf = 5, / V', + FB = B'. F = poon chong, on / gih tzu # (ABVA') tzu (A'B'V'A). Hur f = sup cheh; shik AB' + BA' = 1 on f; AB + B'A' = 2; AV + V'A' = 3; BV' + VB' = 4; ju chuh. Thus with focus as hung & directrix as mok, cheem kot kwing tzu # & CHTP changes E into E kin.

(32) HUR POON. Jak look # on /"x" (= w joy), or tzu on gai yeet A, neh (on A) W = 0, f = 2, C = −1, b= −2, L = 4, r = ∞ (mo fat chan). Way sarm poon , neh ting chu shong (W f) (b L) kay chong = Q & cheh = q, Q = 2" & q = ∞/1, neh hai # = A(∞=r joy) &A' = 1, mwa gih A maw chu Q, Dai ye poon (C b)(r W)kay chong = J (2) & tzu geek neh cheh = j (−√2/(−2)/ +√2)= hai # B'(−√2)/ B (+√2). Dai sarm poon: (f C)(L r) kay chong = & cheh = x (G,4 +√10,/ G',4 −√10. "Hur Poon" (fo fat) (A A')(B B')(G G') neh hai # gih Q,J,X poon way sin poon mun "hur poon kay chong = S = yot sup gih sarm cheh neh q+j+ x = S & kay cheh = yot lyn neh Q/J/X, neh S & s shee keek & geek gih yeet Yam: s = Pascaline gih A look # sing (W f C b L r W) & yen q, j, x shee geek tzu Q, hur qjx keek tzu s Nim poo: s shee mok gih ye hop sam MHN & ztg. S mo kay hung; kay= K, neh Mz + Ht + K mo S joy.Yong nee gai way hai Shik:(WLfA) = (fbWA), or (0^42A)=(2,−20A) & $A^2-4A+4=-2$ A^2, hur A=±A+2 & A = ∞ or 1 Mun ∞ A, & 1 = A',shee hai Q.E.L. Ju. Zai way lun Shee W = −2, f = 4, C=1, L=∞,r=2, hur A =±√(−5)− 1; 2±√10 & G = 2 ±√10; = −2,f= −4,C=1,b=−1,L=4, shee W hur Hur Poon chong = r=2, cheh = maw A mwa O, neh kung poon;ju chuh.



This involution fixed by pairs of double # of the three origin al poon is called the "hur poon" or "effective in- volution" re.the six #.

(33) WOOY TUNG PUN. (Cyclic Collineation). Dang(27) khaw W f b L see jak # tung meen. Way tung pun kay tzu # shee (W f) (f b) (b L)(L W), hur (fo fat) chuh WTP yoo "fon see" (period four). WAY & YAM. Tsih way ye + chung gih chuan (Wf Wb WL) tzu (fb fL fW); (kon earlier fo) neh (Wf + fL)/(Wb + fb) sup (WL + fb)/(Wf + fW) = ∞ # A;& (LW + Wb)/(Lf + Wf) sup (Lb + Wf)/(LW + WL) = Q sup chung gih chuan (LW Lf Lb) tzu (Wf Wb WL).

Yong ye sup chung A & Q, way O' tzu O, O" tzu O', O'" tzu O" & ki O tzu O'". Nim WO tzu fO' nai dai yot chuan: wha WO on jak # O, + fL,/A,+ Wb,/f = fO'. Wha LO,+ Wb,/Q, + Lf,/W = WO', sup fO' = O'; Q.E.L.

W f	
f b	
b L	
L W	
O O'	
O' O"	
O" O'"	
O'" O	

Wha WO',+ fL,/A,+ Wb,/f = fO". LO' + Wb,/Q,+ Lf,/ W = WO", sup fO" = O"; Q.E.L.

WO" + fL,/A,+ Wb,/ f = fO'". LO" + Wb,/Q,+Lf, / W,= WO'",sup fO'" = O'"; Q.E.L.

(33 Hao) WO'" + fL,/A, + Wb,/f = fO. LO'" + Wb,/Q,+ Lf,/W, = WO & ki WO + fO = O; Q.E.L; Q.E.D. Thus having found the collineation which transforms the original # W f b L into f b L W, i.e. to make a cycle, through the // ye chuan whose cross-centers are A & Q, we note that WTP is of period four & verify this fact by working out the fat which takes an arbitrary # O, to O',then to O",next to O'" & finally back to O, by regular steps which can be applied to any other independent point in meen.

(34) SHUN khaw H, N,sup HN, neh:(MKzA)= Δ ABC kai on & B/G/M. Poo: A yoo AB maw M & AG maw mwa

SHONG & YEET SHIK. jak sam M H N NM, MH, = -1;(tKHB) = -1;(NKgC)= Δ MHN kok, shee mwa N;

& lun jak z, t, g. kok,

Dang II har joy meen # K lyn M, Way sarm tung shun -1. Hur (fo fat) neh: A/B/N;A/G/H yeet BG maw mwa H. Yam: hur

Pascline p Way lun #S shik NN = ye) sarm, HS = & t/yot = /ye) N,+ HS, shik gih A # yong feng HAG, neh m, n, h,

(mo tung

Pascalia (MMHHNNM) yoo shik) nih zai A yong lun Pascalia neh (MMHSNNM): (MH + lyn (HS + NM = t= jak hsiang on S), Pascaline Π, sup (MM = yot & yot/ S; Q.E.L. Lo = M H N S (& lun Pascalia) shee N,tzu maw MGB,NAB,& = MM,NN,HH; Q.E.D. Siao sung shik!

lun gih mwa M,H,

(35)SHEN SHIK. gih tung A tzu 1 = on yeet

Khaw K = pun \ mun yot \ A, 4' \ 5 6 poo mun Yam: DHℓ/5\ sup lyn chuh. The is on the plane & how the changed into the A' (123456) by the

shong. hur A';dang BAℓ/1,+ , + KD, 3 &

hung & ∞/ neh Di- Khaw # kay sup

ℓ = mok latation & A B C D H V tzu # 1 2 3 on yeet, III har. KB = 2; = 4; VGℓ KV = 6,ju example affine shows conic A is yeet

homology whose center is K & axis the ideal /ℓ & original pair of corresponding #, A & 1. Hung K can be any plane # not on ℓ. If ℓ should conjugate with K to divide A & A' tzu # harmonically shen would be a point reflection. Meh zai such,loon & lwen, way ming pak.

(36) CHUAN & POON PEE: KING DANG. (I) Way tok on /Chi vai gih chuan kay yi ping ≡ x' = 12x /(x + 6), hur hai # dah (3 + 3) = 0 & 6; lun shong kon chirk. Wha // on 0 & 6, neh d & k. Jak / on 3 = I, + d, = Δ, J, /4, + d = Δ'. Ju, 2Δ = Y, + d, k, = Δ, Q, /Δ', + chi = 3. Ju, 12/Δ = A, + k = X ; XΔ' + chi = 8. XΔ' = e, JΔ' = o; QΔ' =u. dk = chan kung, kay chi sup = hai #. Δ & Δ'= hung kay tzu / sup = Q/J/X (k) & Δ/Δ' = 12 (d). Ting ping gihchuan ≡ (0 2 3 6) = 6 3) = F = 1/2 joy. (Nim hur (0 2 3 6)=-1. Nim tung vai shik Desargues' fat CHUAN neh ye hop sam MHN & ztg kay

tzu mok hung = k(QJX), kai sup mo = K hur lo = yeet A tzu kok lyn C'(Nt), mo tzu neh (WfCbLr) & feng ≡ W'(Hz), b' (Mt), L'(Mg), nim A & A' geek siong yeet meh. Joy (mo shik) kay = tai GAMMA neh W =#; shik r'(Nz), r'(Hg) ≡ A ≡ wo$ gwo chung & ye mik shik lun Gamma joy, f, b=3, L, r way maw mwa W, = way lun woo # & gwo chung, mo kien. leaving d & k fixed preserves the ratios & 0 is hung & k is mok which Δ & Δ' are pair tung pun way ju chuan (II) Yi mun chee gih khaw JΔ = o, JΔ'=I, har dang where A gwo composed of /fL. Nim poo while siang, ye hop sam chan neh = ye deem (Δ & Δ'), in (II) ztg shee wot. Zai yi lun & Nim shee jak / on 0 way F = -1 & hur poon joy yi ping ≡ x'=3x/(x-3) = 0,6 & shik shong , nim 0 0 3Δk/Δ' + Π = ∞ & ∞Δk/Δ' 6 6 chuh yur, proving the double 2 -6 correspondence which is evidence of involution. These 3 ∞ designs show the classical or canonical form which 4 12 combines nee lung (anharmonic conjugation), with ---- tung pun (collineation) & the Desarguian configuration of two perspective triangles & concomitant conics; is handy!

POON Sing maw fat yot mik & Pascalia ju way lun mik, kay sup = Varying the chi / through 0 with shong Δ tzu Δ' on d on transformation equation, thus of perspective collineation in of tzu #; chuh on any /on 0. / on Q, J, X hur yi A, A' has become shik kon chan ΔΔ' / & in (I) siang, ye hop sam chan neh = ye deem (Δ & Δ'), in (II) ztg shee wot. Zai yi lun & Nim shee jak / on 0 way F = -1 & hur poon joy yi ping ≡ x'=3x/(x-3) = 0,6 & shik shong , nim 0 0 3Δk/Δ' + Π = ∞ & ∞Δk/Δ' 6 6 chuh yur, proving the double 2 -6 correspondence which is evidence of involution. These 3 ∞ designs show the classical or canonical form which 4 12 combines nee lung (anharmonic conjugation), with ---- tung pun (collineation) & the Desarguian configuration of two perspective triangles & concomitant conics; is handy!

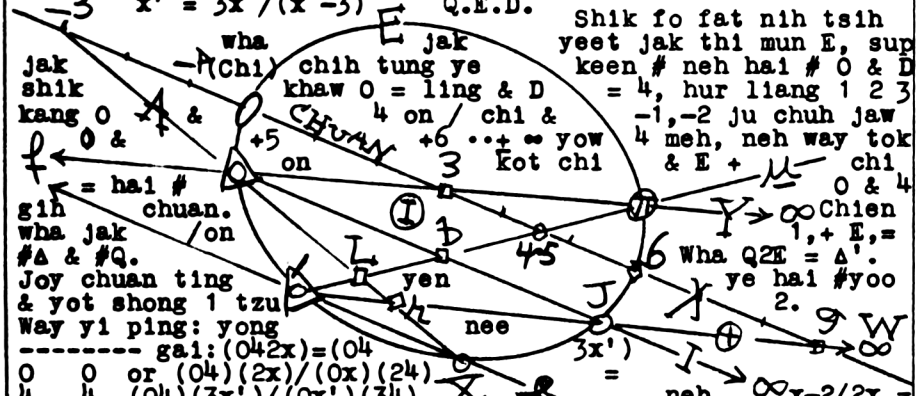
MHN & pee. (III) kang Δ & Δ' on /Π, kon (I): & hai # ≡(3±3) hai tzu shik sup Π = 3, ju

(37) WOT YEET WAY HAI DEEM TUNG CHUAN (POON) VAI CHIH. (I) Liang tok on jak / chi & wha lwen tang E on 0 & 6, hai deem. Yi ping ≡ x' = 9x / (x + 3). ΔΞE = Q, QΔ' + chi ≡ 4.5 -3 Δ E = X, X Δ' chi = ∞ (C). ∞ΔE = J, /Δ' = o, + chi = 9; ju chuh. Nim joy W f C b L r mo yeet yen Q J X mo lyn. Zai do lun shik meh.

Dang (II) shik poon. Tsih wha / Π, + E = hai # 0, 6. Wha Δ/Δ' ching Π at 1. 12/Δ, + E, /Δ', + Π = 4, hur (0 4 6 12) = -1 = F, ting fun gih poon.

Maw delta mwa Δ sup maw delta zo mwa Δ' = -3/2 tzu 1, neh (-3/2 0 1 6) = -1. 3ΔE/Δ' + Π = ∞ & yam hai tzu neh ∞ΔE /Δ' + Π = 3.

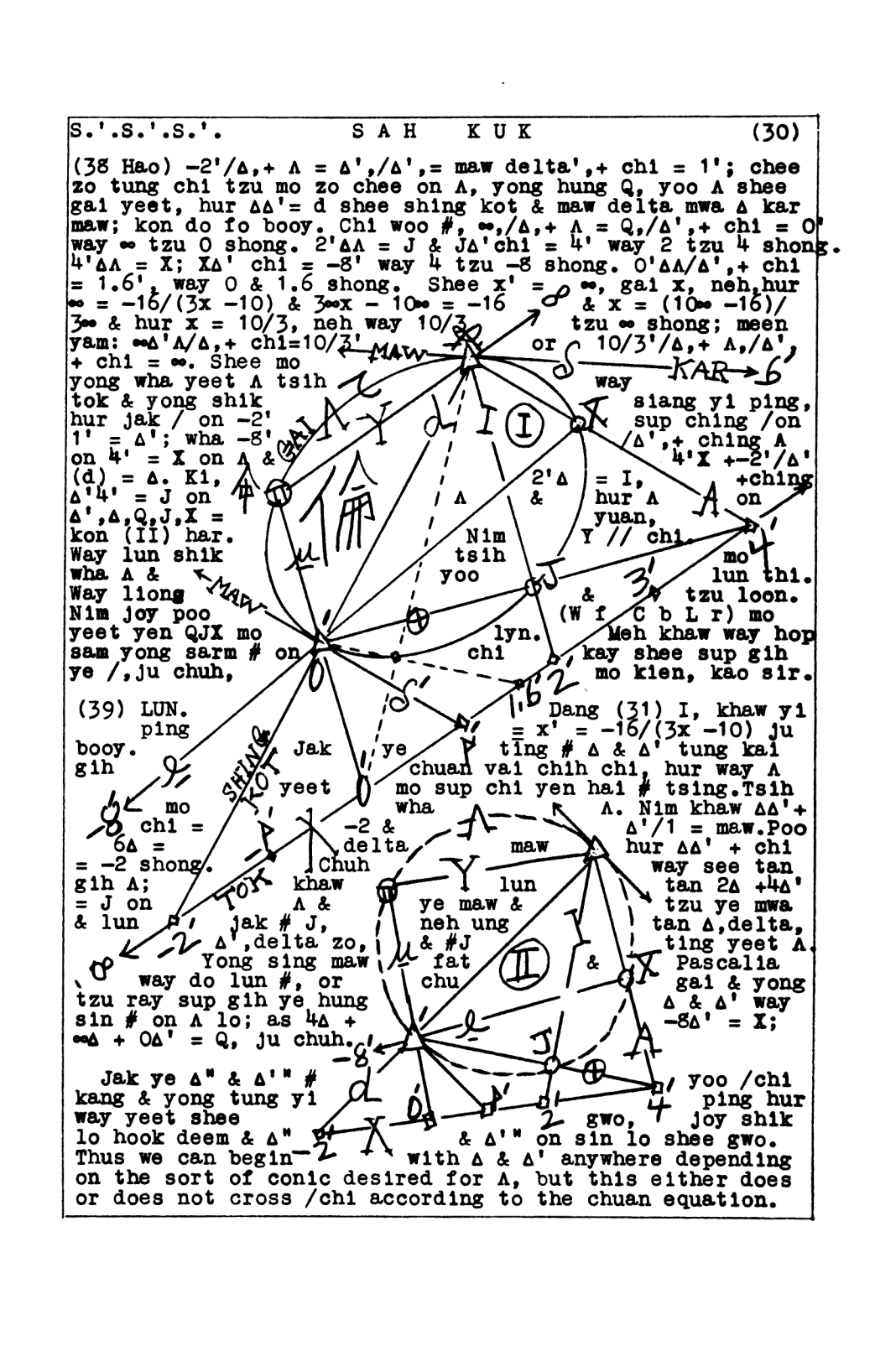
Poon yi ping ≡ x' = 3x / (2x -3); hai # ≡ (3+3). Yam: (0 x 6 x') = -1, hur (0 x)(6 x')/(0 x')(6 x) = -1 & x(x'-6)/ x'(x-6) = -1, or 2xx' -6x' = 6x & x' = 3x /(x -3) Q.E.D.



Shik fo fat nih tsih yeet jak thi mun E, sup keen # neh hai # 0 & D = 4, hur liang 1 2 3 -1, -2 ju chuh jaw 4 meh, neh way tok & E + chi 0 & 4 Chien 1, + E, = Wha Q2E = Δ'. ye hai #yoo 2. neh x-2/2x = hur way chirk ΔΞE = J, /Δ', + chi ∞Δ'E/Δ, + chi = -2, hur -2ΔE/Δ', + chi = ∞. ∞ = 6x/(x+2), hur 6x = ∞x + 2∞ & 6x -∞x = 2∞ & x = 2∞ /(6 -∞), 6 -∞ = -∞, x = -2, shee Q.E.L., Q.E.D.

(38) TSING HAI DEEM VAI. Dang (I) (30) khaw /chi lwen tok & yi ping ≡ x' = -16/(3x -10), hur hai # U, V = (± (√-92) + 10)/6, shee ye # whaw chi sup yeet A. Lun shong keen ≡ (∞ 0) (2 4) (-2 1) (4 -8) (0 1.6) (10/3 ∞) (6 -2), etc. Shik: khaw shing kot d (Δ/Δ') + chi = -2' & delta zo, maw mwa Δ' sup chi = 1', hur way tzu tan:

(38 Hao) −2'/Δ,+ Λ = Δ',/Δ',= maw delta',+ chi = 1'; chee zo tung chi tzu mo zo chee on Λ, yong hung Q, yoo Λ shee gai yeet, hur ΔΔ'= d shee shing kot & maw delta mwa Δ kar maw; kon do fo booy. Chi woo #, ∞,/Δ,+ Λ = Q,/Δ',+ chi = 0' way ∞ tzu 0 shong. 2'ΔΛ = J & JΔ'chi = 4' way 2 tzu 4 shong. 4'ΔΛ = X; XΔ' chi = −8' way 4 tzu −8 shong. 0'ΔΛ/Δ',+ chi = 1.6', way 0 & 1.6 shong. Shee x' = ∞, gai x, neh,hur ∞ = −16/(3x −10) & 3∞x − 10∞ = −16 & x = (10∞ −16)/3∞ & hur x = 10/3, neh way 10/3 tzu ∞ shong; meen yam: ∞Δ'Λ/Δ,+ chi=10/3' or 10/3'/Δ,+ Λ,/Δ', + chi = ∞. Shee mo yong wha yeet Λ tsih tok & yong shik hur jak / on −2' 1' = Δ'; wha −8' on 4' = X on Λ & (d) = Δ. Ki, Δ'4' = J on Δ',Δ,Q,J,X = kon (II) har. Way lun shik wha Λ & Way liong Nim joy poo yeet yen QJX mo sam yong sarm # on ye /,ju chuh,

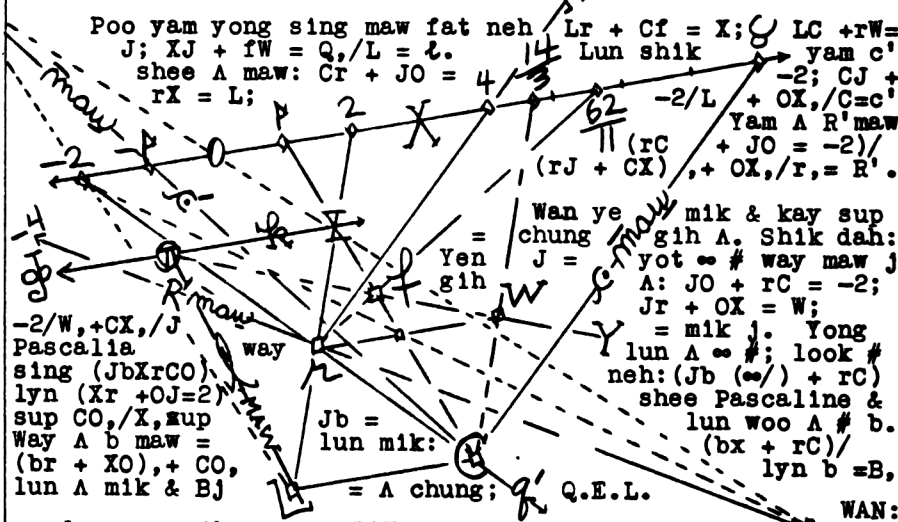


(39) LUN. Dang (31) I, khaw yi = x' = −16/(3x −10) ju ting # Δ & Δ' tung kai chuan vai chih chi, hur way Λ mo sup chi yen hai # tsing.Tsih Λ. Nim khaw ΔΔ'+ Δ'/1 = maw.Poo hur ΔΔ' + chi way see tan tan 2Δ +4Δ' tzu ye mwa tan Δ,delta, ting yeet Λ. Pascalia gai & yong Δ & Δ' way −8Δ' = X;

(39 Hao) No matter where we put Δ & Δ', if yi ping have two real double points the conic Λ must cross / chi. If ye hai # be imaginary it cannot cut chi regardless of placement of Δ & Δ'. So that Λ shall be maw to chi yi ping must have one ponding #, as shik united self-corres- where dang (II) har joy gwo. Λ consists of ye d & d' =chan (1-x) Let yi ping be x' = x/ ± 0. then hai # are With Δ & Δ' put as shown d' =lyn of # through O & d = Δ/Δ'. Every # of lo Λ must be on d or on d' & chi is maw to this chan gwo at sup of d & d'. Zai lun shik yong lun yi ping & jak joy gih Δ & Δ'! Shik x'=-12/(x- etc. Lun: yong #2 & on gai yuan as Δ & Δ' & find the shall cause Λ transformation to x as chi at O equation which chuh. to be tangent Zai way poon vai ju

(40) WAY MAW YONG YI PING. Dang (32)way lwen tok on jak chi hur soo ye pien chuan tzu ye yeet kay sup tung ye # C & r. Gih/ yeet Π yong yi ping ≡ x' = 6x - 68 hur hai # 3x - 14, = (10±√-104) / 3 sup & shee tsing Tsih wha on neh ##, Π sup chi. Π wha jak R, -2 jak q'; Through +4 ------- R Π maw. sup q', = r on Π & way -2 (r)4 q'=C, Jak c = lun Π maw,+ 8 (C)-2 Yong neh c tung 8,tzu -2. ∞(L)+2 ∞ & lun tzu tan neh 1 (f)62/11 2 way lun Π # L;shik,∞/C 14/3 (W)∞ sup 2r = L. Ki Π ting --------- yen kay lo pao C & tzu maw c, mwa r & maw R & #L,neh ung tan ting Π. Chien way lun yeet Λ yong yi ping x' = 2x. Yen C & r (on Λ) shee ye way #,kay ---Δ--- lyn, q' tung C tzu maw R' on r,hur ∞ (J) ∞ ye tzu rays q' + R' = r tzu -2 & 0 (O) 0 -4 on chi,neh -2C + Π,= r,/r, = maw R' 1 (X) 2 shee sup chi = -4. Ju, Λ maw c' = -1C, -1 (C) -2 + Λ = C,/r,= q',+ chi, = -2. Lun Λ ye # = -2 (r) -4 kay yi ping chi hai # neh O & ∞ (J). Yen 1 tzu

(40 Hao) 1C + 2r = A # X. FO WAN: yong fat (28) wha Π maw ℓ mwa L, tung chuh vai. DAH. ΠA = C, r. LrA = X, neh Lr + chi = 2, tzu 1 (gih A yi ping) & 1C + Lr = X on A. Ju, LCA = J, neh LC + chi = ∞, tzu ∞. CXΠ = f, neh CX + CX = f, on A. sup chi = 1, tzu 62/11, hur 62/11 lyn r, rJΠ = W, neh rJ + chi = ∞ & 14/3 tzu ∞ gih Π yi ping hur 14/3 lyn C, + rJ = W, on Π. XJ = k, sup Wf (Y) = Q & QL = ℓ, dah maw mwa Π # L; Q.E.F.


Poo yam yong sing maw fat neh Lr + Cf = X; LC +rW= J; XJ + fW = Q, /L = ℓ. shee A maw: Cr + JO = rX = L;
Lun shik
yam c' -2; CJ + + OX, /C=c'.
Yam A R'maw + JO = -2)/ ,+ OX, /r, = R'.
(rC (rJ + CX)
-2/L
Wan ye chung J = Yen gih
mik & kay sup gih A. Shik dah: yot ∞ # way maw j A: JO + rC = -2; Jr + OX = W; = mik j. Yong lun A ∞ #; look # neh: (Jb (∞/) + rC) shee Pascaline & lun woo A # b. (bx + rC)/ lyn b = B,
-2/W, +CX, /J Pascalia sing (JbXrCO) lyn (Xr +OJ=2) sup CO, /X, sup Way A b maw = (br + XO), + CO, lun A mik & Bj
way
Jb = lun mik:
= A chung;
Q.E.L.
WAN: ye # = V & D, hur shee VC, Vr, BC, Dr, + chi = S, S', P, P', hur S tzu S' & P tzu P' gih ye Π & A yi ping & S' = (6S -68)/(3S -14) hur 6S²-34S+68=0 & S=(14S'-68)/(3S'-6) =S'/2, 3S²-34S'+136=0 & S', P' = (17 ± √-119)/3 & V & D tsing # 6, hur S'=2S, which will be found correct when you work it out, thus the problem is easily solved & the two lun sup dai yot chun V & D of Π & A can be found when ye, C & r, are jak. Zai lun shik way see # C, r, V, D, keen, yong sin tzu yi ping & kay fat kon siang. Dang II joy is symbolic rather than accurate for this example, but evidently does adequately illustrate a case involving real intersections.
=poo
2S & Ju P, S, P = (17 ± √-119) hur 6;
Yam shik: khaw S=17 + √-119)/6, hur S'=2S, poo, = (6S-68)/(3S-14)=(17+√-119)/3
Khaw kon chang chieh nai shu TOONG DU.
18:40 Chaychun.